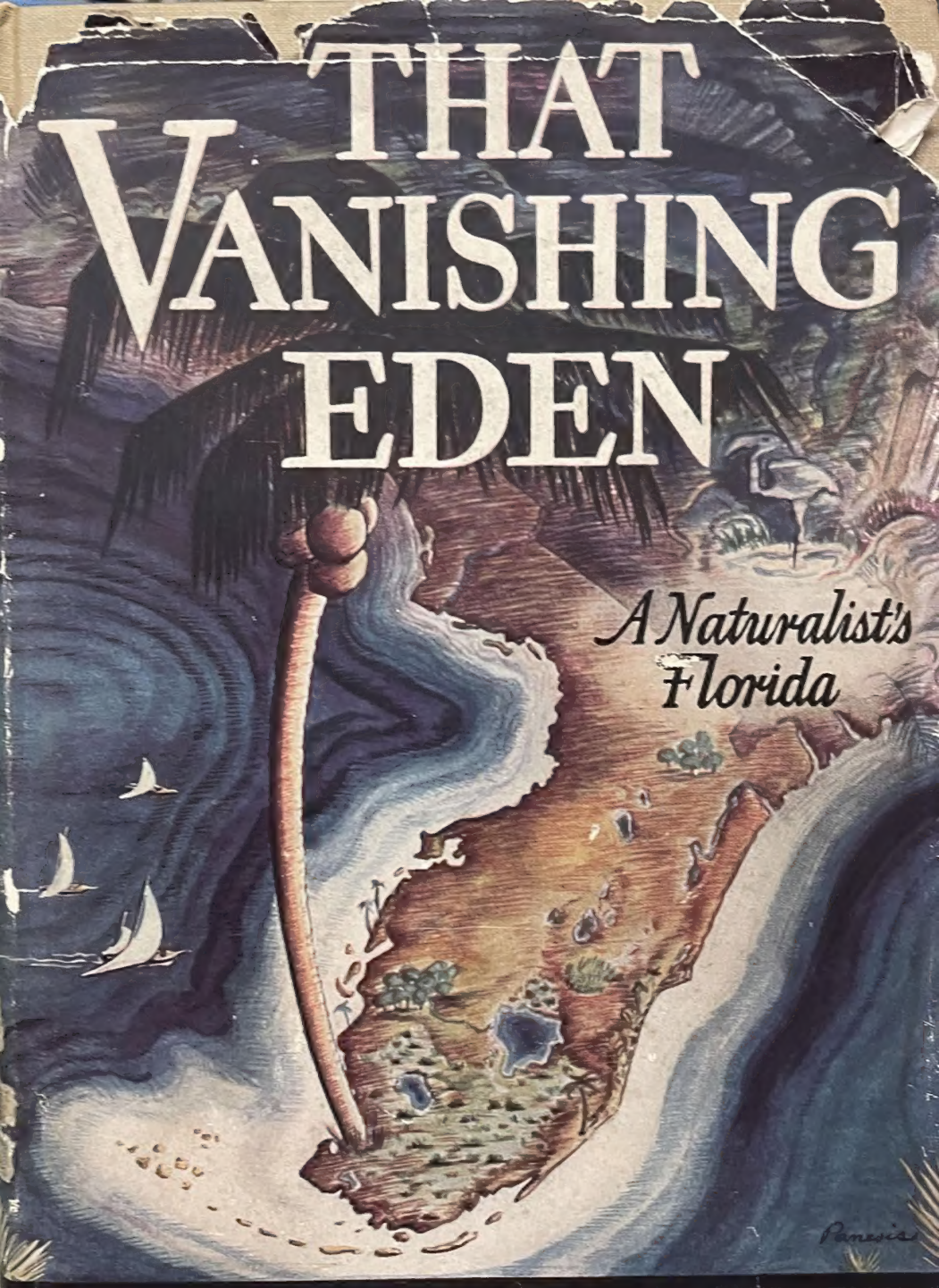
THAT VANISHING EDEN

A Naturalist's Florida



BY Thomas Barbour

Matilda O'Donald

1944

From

WAKE FOREST UNIVERSITY LIBRARY
QH105.F6 B3 EWFF
Barbour / That vanishing Eden, a naturalist's Florida
3 0399 0130165 /

WAKE FOREST UNIVERSITY
THE Z. SMITH REYNOLDS LIBRARY

CALL NO.
QH105
F6
B3

Z. Smith Reynolds Library
Wake Forest University
Circulation Department

Please return this book promptly. To avoid a fine it must be returned by the closing hour of the latest date stamped below.

403453 NXW

For Ma

Christmas 19

THAT VANISHING EDEN:

A Naturalist's Florida

BY THOMAS BARBOUR

Naturalist at Large

That Vanishing Eden:
A NATURALIST'S FLORIDA

MATILDA O'DONALD
JACKSONVILLE, FLORIDA

That Vanishing Eden

A NATURALIST'S FLORIDA

THOMAS BARBOUR

ILLUSTRATED

An Atlantic Monthly Press Book

Little, Brown and Company · Boston

1944

COPYRIGHT 1944, BY PHILIPS KETCHUM, TRUSTEE UNDER AN INDENTURE OF TRUST MADE BY THOMAS BARBOUR FOR THE BENEFIT OF MARY B. KIDDER, JULIA A. BARBOUR AND LOUISA B. BARBOUR, DATED JULY 19, 1943

ALL RIGHTS RESERVED, INCLUDING THE RIGHT TO REPRODUCE THIS BOOK OR PORTIONS THEREOF IN ANY FORM

FIRST EDITION

Published November 1944

ATLANTIC–LITTLE, BROWN BOOKS
ARE PUBLISHED BY
LITTLE, BROWN AND COMPANY
IN ASSOCIATION WITH
THE ATLANTIC MONTHLY PRESS

PRINTED IN THE UNITED STATES OF AMERICA

I dedicate this book to

MY WIFE AND DAUGHTERS

for the kindness which they showed me
during the winter of 1944

My thanks piled high, pressed down,
still running over, to Edward Weeks
and Dudley H. Cloud for their advice
and wise counsel

QH105
F6
B3

Contents

	Introduction	3
I	The First to Arrive	7
II	Bartram's Florida	22
III	Mounds	35
IV	Seminoles	45
V	The Norther and the Hurricane	62
VI	Forests and Fire	71
VII	Camping	86
VIII	Beaches and Sponges	102
IX	Springs and Lakes	116
X	Mammals	131
XI	The Florida Ditches	145
XII	The Garden of Eden	156
XIII	Alligators and Crocodiles	178
XIV	The Islands and the Keys	194
XV	The Kampong	204
XVI	The Fairchild Tropical Garden	216
XVII	The Everglades National Park	224
XVIII	The Future	231
	Acknowledgments	239
	Index	241

WAKE FOREST UNIVERSITY
LIBRARY

Illustrations

The Coconut Palm	*Frontispiece*
In the Dig at Gilchrist County	10
Skull of a rhinoceros found in the Dig	10
Walden Cottage, Eau Gallie	36
Sarah Elizabeth Barbour and a friend	36
The big shell mound at the mouth of the Banana River as it was in 1912	40
The Seminoles of the early nineteen hundreds	50
Seminole debutante of the nineteen-forties	50
The cypress on New River, site of Fort Lauderdale, taken in 1884	82
The Model T, with campfire burning	88
The upper reaches of the Loxahatchee River	88
Camp at the Loxahatchee Marsh	124
The houseboat in the Palm Beach Canal, 1919	124
The author in Florida	136
Pelican Island. The first bird sanctuary in North America	148
Egrets and "jackdaws" in the Everglades	148
The Colohatchee River covered with floating vegetation	170
The strangler fig on the Charles Deering Place at Cutler, Florida	170

The old crocodile hole, Indian Creek, Miami Beach, about 1885 182
A mangrove swamp along the shore 196
The interior of a mangrove swamp 196
The Fairchilds and the Barbours in front of the author's house in the Kampong 208
The Everglades 228
Miami River, 1884 232
The same spot, 1944 232

THAT VANISHING EDEN:

A Naturalist's Florida

The old crocodile hole, Indian Creek, Miami Beach, about 1885 182
A mangrove swamp along the shore 196
The interior of a mangrove swamp 196
The Fairchilds and the Barbours in front of the author's house in the Kampong 208
The Everglades 228
Miami River, 1884 232
The same spot, 1944 232

THAT VANISHING EDEN:

A Naturalist's Florida

Introduction

THIRTY years ago Florida was one of the most extraordinary states in the Union, but being flat and quite parklike in character (a large part of the country consisted of open pinelands) it was an easy state for man to ruin, and he has ruined it with ruthless efficiency. In the pages that follow, I have tried to recapture some of the original charm Florida held, not only for the naturalist, but for any observer of this rich and versatile land. I shall refer to relatively few birds, for A. H. Howell's splendid book on the birds of Florida which appeared in 1932 is entirely adequate, nor is my book intended to be a zoological or a botanical treatise. Technical studies on the fauna or flora are abundant and excellent. Carr's *Herpetology*, Hobbs's *Crayfish*, Small's *Floras*, and other similar works are accessible to the scientific inquirer. My book is purely for the casual visitor seeking relaxation who wonders what the country was like before it was reduced to the condition in which he sees it today.

A large part of Florida is now so devastated that many of her friends are disinclined to believe that she ever could have been the Paradise which I know once existed. If you are interested in land-promotion schemes, horse racing, dog racing, night clubs, or other activities pandering to the purely carnal interests of man, do not read on.

For forty-five years I have been commuting to this Eden. But my knowledge of the East Coast goes back before that. I remember the days when, as a small boy, I was held up by an old gunnery sergeant and allowed to look over the parapet into the enclosed area within old Fort Marion at St. Augustine, where Geronimo and his bands of Apache Indians were then imprisoned. I remember also, when I was a little older, the stern-wheelers that plied the inland waterway along the East Coast, starting from St. Augustine and fetching up at Jupiter. The *Eastern Queen*, the last of these ships, used to stop at the dock leading to my grandmother's house at Eau Gallie the first year I went to Florida, which was 1898.

Lest I paint too gloomy a picture of the state, let me admit that the last time I visited Lake Washington and the St. Johns River marsh I saw one rookery with not less than 100,000 pairs of breeding white ibis; while egrets and other birds which were rare at the time of my first visit now charm the eye a hundred times a day as one travels by motorcar and watches the roadside ditches.

When I made my first visit to Miami I don't suppose there were over a few hundred inhabitants. My growing interest in fossil collecting led to the discoveries which are recounted later in this book, and then sheer curiosity and the love of new scenes tempted me to cross and recross the state, east and west and north and south, on numberless excursions, most of them delightful. It is for these reasons that I feel qualified to describe the Florida that was and the Florida that is.

While natives of Florida are mentioned incidentally from time to time in what I have written, I have made no attempt to describe the people in the backwoods, who still live as most of the inhabitants of the state lived years ago. For this was never a region of large plantations except in the extreme northern part. Mrs. Marjorie Kinnan Rawlings in two of her books, *South Moon Under* and *The Yearling*, has given a picture of rural life in that part of Florida which today is called "the scrub." Her latest book, *Cross Creek*, is a pleasant picture of life in that portion of North Central Florida characterized by orange groves and small farms. These three volumes are so good that it ill becomes me to trespass on a field which she already has made so eminently her own. I know the country and the way of living of which she writes, and I endorse not only the accuracy of the picture which she has painted but the charm and sympathy of her approach.

For half a century I have fished and hunted, dug or collected specimens in the waterways, forests, and scrub. My travels from north to south have been by motor, and since these travels began I have studiously tried to vary the routes. Thus I have seen the state time and time again, until I do not think there is a single one of the sixty-seven counties through which I have not passed with some observation. Florida has a far larger area than the average traveler, who simply goes straight to Palm Beach or Miami and returns north, ever appreciates. The run from

Key West to Pensacola, for instance, is something over a thousand miles.

Statistics make dull reading; but there are a few which any casual explorer of Florida ought to keep in mind. The boundaries of the state contain 54,861 square miles of land, and, besides this, there are 3805 square miles of water enclosed within its area, making a total of 58,666 square miles. The extreme distance from west to east, across the northern part of the state, is 467 miles; while the extreme length of the state, from the northern boundary to the southernmost Keys, is 444 miles. This would mean that the east–west and north–south distances are comparable to the stretches from Buffalo, New York, to Norfolk, Virginia, and from New York City to Columbus, Ohio. It has been computed that there are no less than 1221 miles of tidal shore line, which is probably an underestimate.

The terms "East Florida" and "West Florida" appear in many of the old geography books, the explanation being that the state was cut into two separate colonies when it was in the possession of Great Britain almost two hundred years ago. "West Florida" is still a term in common use. The Apalachicola River, formed by the junction of the Flint and Chattahoochee Rivers which flow south out of Georgia, formed the old boundary, just as the Perdido River since time immemorial has been the boundary separating the western portion of West Florida from Alabama.

And now let us enter Eden.

CHAPTER I

The First to Arrive

THE LATE W. D. MATTHEW, an accomplished paleontologist, an excellent geologist, and a simple and most charming man, once said to me that the geology of Florida looked very easy to understand, but that in reality it was exceptionally baffling and difficult of interpretation. During the last decade, however, such an advance has been made in our knowledge of the vertebrate life which existed in Florida over the past forty million years that it is now possible to picture the extinct animals of the region as never before.

The submarine platform on which the peninsula of Florida rests has been unstable. Florida has been up and down, rippled, folded, and crumpled to a degree that makes its story extremely difficult to decipher. I don't think any two authorities are wholly in agreement as to just what has happened since Oligocene times, or roughly some forty million years ago. But now the paleontological evidence is fast accumulating and our understanding has been enlarged since 1884 (the year in which I was born), when Dr. J. C. Neal first sent Dr. Joseph Leidy of Pennsylvania some bones of a young mastodon, or a rhinoceros, and several fragments of camels and horses found in Levy County, Florida.

There is very good reason to believe, as my colleague Dr. Theodore E. White has explained in his report on the findings at our dig in Gilchrist County, that northwest Florida was an island for a long time. The base or platform on which the peninsula of Florida stands is old, very old. Fossils in the form of marine shells and sea urchins, which appear in the material thrown out of ditches in various parts of southern Florida, date from a time when the region was certainly under water, but do not necessarily show the time when it emerged. Generally speaking, we know that all southern Florida which is now above water is certainly more recent than the northern part of the state.

Northwest Florida was once an island, and accordingly maintained an isolated fauna of considerable variety. This fauna, because of its very isolation, proceeded to evolve along quite independent lines from those of the related forms on the continent. For instance, none of the fossils found in Gilchrist County are the same as those found in the well-known quarries in the Badlands of our western states, which presumably are of the same age.

This dig in Gilchrist County which I have mentioned has proved to be the source of some very significant material. The story of its discovery is worth telling. Clarence Simpson of the Florida State Geological Survey, a keen and enthusiastic observer, happened on a remarkable sand pile near a deserted house, far out in the scrub of Gilchrist County, one of the most sparsely populated and backward regions of the state. The sand pile had

been thrown up in the course of digging a well for the old Raeford Thomas Farm, long since abandoned. As he poked about, Simpson spotted some broken bones lying half-buried in the sand. A little later he returned to the old farm, camped there for a few days, and collected some fragments. These were submitted to the paleontologists of the American Museum of Natural History in New York, and a short paper was written describing them. They were then returned to the Museum of the Geological Survey at Tallahassee, where they remained unnoticed until I chanced to see them in 1938. At the time, the Survey was swamped with geological projects and had no time for paleontology.

A year later, I returned to Tallahassee and asked Dr. Herman Gunter whether there were any plans for doing further work in Gilchrist County. He said no. So first with the help of Mr. and Mrs. William Schevill of the staff of the Agassiz Museum in Cambridge, and then with the infinite patience of Clarence Simpson, we were able to locate the old farm. It was no easy matter, since half the population of this part of Florida bears the honorable name of Thomas, and old Raeford Thomas's farm had been deserted for over forty years.

We began to dig there in a small way. What we found was promising and we have continued operations each dry season since. In the bulletin of the Agassiz Museum Dr. White has described the animals which we have found thus far, all of which have proved to be of the Lower Miocene Age. Most of the localities in the eastern

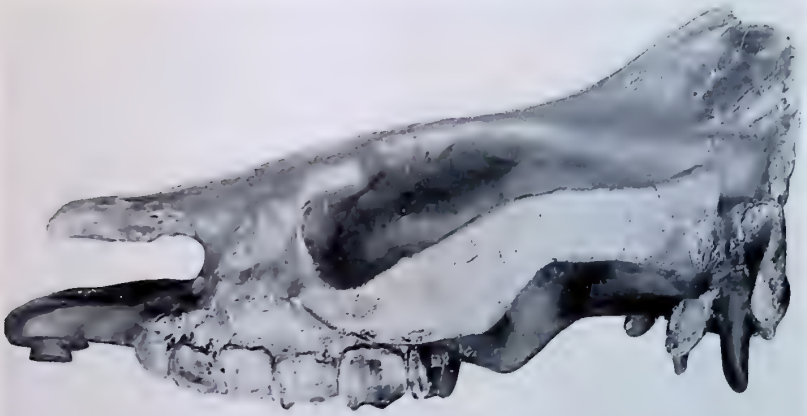
part of North America where Miocene material is to be found are of marine origin. But what we uncovered at the Thomas farm gives a fine picture of the terrestrial life in that epoch.

In time, I found that the title to the old farm was held by a bank in Macon, Georgia; I ended by purchasing the forty acres where the fossils are located, and have deeded it to the University of Florida, so it will be protected for all time. The farm is about forty-five miles from Gainesville.

Our excavation started as a modest little trench in the sand; now it is a great hole in which one could put a large house. Many new and interesting animals have been found, represented by sufficient material for scientific description; but we know from other fragments which have been found, which were too small to describe, that there are a number of other animals still awaiting discovery. Naturally, we look forward with the greatest interest to further exploration when better times and Dr. White's return from service abroad make this possible.

The Thomas farm is about fifteen miles north of Trenton, the county seat. Trenton in turn is about fifty miles north of Archer in Levy County, where sixty years ago Dr. Neal found the bones he sent to Philadelphia. Near Trenton my friend Dr. Childs Frick is working a very remarkable site at Williston. This locality is of the Pliocene Age – that is to say, much more recently deposited than our Miocene material. It

In the Dig at Gilchrist County



Courtesy of George Nelson

Skull of a rhinoceros found in the Dig

is also very much better preserved, and it represents not only some of the descendants of the animals of the Miocene island but subsequent immigrants as well.

The pebble phosphates and the phosphate mines of Polk County are more or less contemporaneous with the deposits about Archer. Here in Polk County for years we have been mendicant friars, and many friends at the mines have become scouts for the Museum. From these phosphate beds we have remains of antelopes not distantly related to our western pronghorn, and primitive pigs, and tapirs, totally unlike anything which we find at the Thomas farm. It is extremely unfortunate that the mining of this phosphate – which is done by hydraulic guns shooting a stream of water with prodigious force – is so extremely destructive. There is no doubt that many fossils are blown into tiny bits, while only with luck are others found in pieces large enough to be recognizable. Moreover, the material is so scattered that any program of systematic digging for these fossils would be prohibitive in cost and wasteful of time.

There is some confusion as to the age of the phosphate beds, but there is no doubt that some of the material collected from them represents bones which were laid down elsewhere in earlier times and redeposited by water action to help form the present phosphate beds. It is not unreasonable to guess that the Pliocene beds may have been laid down from twelve to fifteen million years ago.

Now I am going to make a fool of myself and try to sketch three pictures of the animal life of Florida in the

past. I myself have taken more or less representative material of each of these three epochs; it now enriches our Museum in Cambridge.

The Miocene

(*Say about thirty million years ago.*)

There is no reason to suppose that the topography during the time of which I speak was very different from what it is at present. The country may have been somewhat more rolling, for there is evidence that streams ran quite swiftly, but there were no high hills. We suspect the streams to have been strong-flowing. Otherwise they would not have carried this extraordinary mass of disassociated skeletons of animals, which must have died over a very long period of time, to redeposit their bones where we now find them.

To support the variety of animals and the number of individuals indicated by what we find, I do not believe the vegetation necessarily had to be very much more lush or "tropical" than it is now. It may have been, but I recall the rather sterile character of the vegetation of the Athi Plains in East Africa: the number of species and individuals of antelope which that country supports is bewildering. Substitute for some of these antelope a number of species of little three-toed horses, from the size of a collie dog to that of a Shetland pony, and I believe the comparison to be a pretty fair one.

With a population of this sort there would inevitably

be carnivorous animals present as predators. There were as yet no lions in Florida, as there are in Africa—curiously enough cats seem to have been very rare or absent; but giant doglike creatures certainly abounded. There were several species of such animals as big as grizzly bears, and there were a number of others the size of jackals. The two categories were abundant, both in species and in individuals. Our finds prove this clearly.

There were some small camels, probably very like the modern vicuna of South America. These apparently were far less abundant than the little horses – in number, probably not one to five hundred. We also find some remains of primitive ancestral deer. One of these we have named "Hypermekops," and it is a most extraordinary beast. It has a great long snout, the whole skull being more or less tubular in shape, almost as prolonged as in some of the anteaters and really ridiculous-looking. We know this beast only from a single skull and presume that it must have developed some highly peculiar and specialized method of feeding to give rise to such a curiously shaped head. The bizarre distribution of its teeth along the anterior portion of upper and lower jaw is unique too. (*Query:* Did this beast poke its nose down under the water and pull out some particularly succulent sort of lily roots? Here again, as in so many problems connected with paleontological evidence, your guess is exactly as good as mine.)

Fossil birds are never very satisfactorily represented,

and we have only a few bird bones from the Thomas farm. These, however, submitted to Dr. Alexander Wetmore of the United States National Museum, revealed a new family – which he called the Rhegminornithidae – related to the shore birds, and fragments of an extinct dove, and something not unlike one of our warblers.

Information about the small animals is gradually accumulating, but the story as yet is very incomplete. We are still digging with local help, and will keep on doing so, I hope, for many years to come.

To show the fortuitous character of fossil hunting I may cite the following occurrence. In the late spring of 1944, the opportunity presented itself to take my wife and my daughter Louisa out to see the dig. Rosamond was most interested in the locality although the heat down in the floor of the excavated area was breathless and blistering. Nevertheless she scratched about and picked out quite a number of bones. She brought them to me to tell her what I suspected they might be, when to my inexpressible surprise she handed me the molar tooth of a giant rodent – an ally of the capybara of South America and of our North American porcupine, not a near ally, to be sure, by any means. Here in a short space of time spent scratching about she had found evidence of the presence of a whole category of animals, no vestige of which had ever appeared before. We had been digging for a good part of four years. This tooth of Neochoerus is probably an intrusion from the

Pleistocene, but even so nothing of the sort had ever turned up in all our years of digging.

There is nothing to show that the elephants had as yet arrived in this part of the world. Rhinoceros there were. One large species – the largest about ten feet long – is not very different in size from the ordinary run of present-day rhinos. Another species was much smaller, and apparently rarer. At first sight it may seem peculiar that two sorts of rhinoceros should occur together in the same territory; but it is quite possible that they occupied different environmental niches. Perhaps they fed in different types of country, one species not competing with the other. I well recall that one day in Zululand, in the Hluhluwe Reservation, my family and I saw black rhinoceros and the so-called "white" rhinoceros occurring side by side, although their ranges usually are separate.

If I were here to write this book half a century from now, I should probably be able to supply a great many details which would make this picture more clear. I may add – for this is a matter of real zoological interest – that we have beautiful material representing the Miocene alligator, unquestionably a direct ancestor of the animals common in Florida today. The Chinese alligators are quite obviously derived from those fossil forms known from the Badlands of the Dakotas, and our Miocene form was also probably derived from Oligocene alligators of the western Badlands.

The Pliocene

(More or less twenty million years ago.)

Let me begin by telling the story of an enormous claw which we found in material taken from a phosphate mine last year. At first sight, before it was cleaned up, we thought we had a remnant of the giant of all cats. It obviously came from an enormous animal. Luckily Dr. W. B. Scott of Princeton, a master paleontologist, turned up in the Museum at Cambridge at exactly the right moment, and said the claw was definitely Megatherium. Most of my readers will recall pictures in old-time natural-history books of a gigantic sloth from South America. It was always depicted standing up with its forepaws resting in a treetop; presumably it was browsing daintily off the topmost limbs. That was a little bit of exaggeration. But our Florida ground sloth of this type was the largest which has ever been found – by working out mathematical proportions, we may presume that it was at least thirty feet long – perhaps the heaviest land mammal which ever lived.

Dr. Leidy, in 1886, received an astragalus, or heel bone, presumed to represent this genus, which had been found by Dr. Neal. The evidence, though not abundant, makes it entirely clear that this gigantic sloth inhabited Florida.

Fragments of plates from the shells of gigantic armadillos are frequently found, and these animals persisted

a long time, since bits of shell fragments appear in deposits much later than the Pliocene.

The horses, probably of three quite different sorts, were larger than those I have been talking about. They were still three-toed, but the bones show a chunky, cobby animal which would have carried a man had he been there to ride. Moreover, at about this time there must have been opportunity for widespread migration – because this horse, called Hipparion, reached Europe and is abundantly represented at Samos and Pikermi in Greece.

There were some big peccarylike creatures; and a giant wolverinelike animal which one might call the hyena of that day (providentially, this type skull was not smashed to bits in the mining and is extraordinarily well preserved). Mastodons were abundant, and there were camels and deer, or rather, deer allies. There were also allies of our prong-horned antelope, the rhinoceros, and several large, slothlike creatures. Saber-tooth tigers had arrived, probably from the West, but their remains are very rare.

The Pleistocene

(More recent – began at the end of the Pliocene and lasted to perhaps fifty thousand years ago.)

The scene has changed completely. True elephants have appeared in great abundance. I recall a story illustrating this fact. My brother Frederick was rowing a

boat in which Frank Carlisle, our camp cook and companion, and I were sitting. I was in the stern, trolling for big-mouth black bass; I looked up – and there, sticking out of the canal bank just above water level, was a little black patch of something, a couple of square inches in area. I said, without feeling much of the spirit of surprise: "There's an elephant's tooth." Frank was utterly bewildered and began to argue that there had been no circus about.

I scratched out the specimen, which was a very large one, with my fingers, and marked the spot. Then I returned the next year and dug up parts of a perfectly gigantic animal. Unfortunately, the dredge which had made the canal ditch had ruined the skeleton and I did not recover enough to mount. The great shoulder blade, however, is on exhibit in the Museum; when I showed it to Dr. Foster Cooper, the English paleontologist now Director of the British Museum of Natural History in London, he declared it represented the largest individual animal of which he had any knowledge; and he knows a great deal about fossil elephants.

By this time the horses had developed, and become horses in the very same sense in which we use the word. They belonged to the same genus, Equus. That they were abundant is shown by the fact that at least six hundred teeth appeared during the digging of one of the hazards for the golf links at Melbourne in Brevard County. Teeth are naturally much more abundant than other bony structures because, being very hard, they are

more likely to be preserved. I have one almost complete pair of lower jaws which give an excellent idea of the size of the animal. It was about as large as a light draught horse.

Tapirs occurred, not very different from those we see in South America today. A few of the gigantic armadillos still persisted, and there were some giant camels and some oxlike or bisonlike creatures of which, unfortunately, I have never found anything but very fragmentary skeletal material. We still have much to learn concerning this fauna – which is a surprising fact, because their date is relatively so recent.

The Pleistocene Age was one from which the fossil remains are badly preserved and generally fragmentary in the extreme. That animal life was abundant is proved by the enormous number of teeth. Deposition usually took place in sand, and this was subject to leaching by rain and penetration by plant roots, which means that most bony material tended to disappear. Of course there have been exceptions: the splendid great elephant from Melbourne mounted in the Amherst College museum is one of these. But I feel sure that it is safe to say that we have only a small part of the picture of what must have been a rich and varied fauna. The Pleistocene is uncertain to work and usually unrewarding. Nevertheless, in time a thrilling story will unfold.

I have often been asked why the horses finally disappeared from Florida, such a very short time ago geologically speaking, before the Spaniards arrived to re-

introduce them. We know that no climatic changes or conditions affecting food supply could have arisen. The horses the Spaniards introduced ran wild and throve at once. Their survivors existed until a few years ago: the ponies which I rode as a boy were caught from herds running wild on Anastasia Island near St. Augustine. They were very similar in appearance to the so-called "wild ponies" of the islands off the North Carolina coast, especially Ocracoke. Whether primitive man appeared on the scene and the native stock was so tame and stupid that it allowed itself to be killed by the advances of this early man is a question. Some widespread and devastating epizootic disease is an even more probable explanation for the rapid and complete disappearance of the horses – but the disease must have disappeared too, for the animals introduced by the Spaniards flourished at once.

At the risk of becoming perhaps a little technical, I am going to expand and in some degree restate what I have said concerning the changes which have taken place during the uplifting and the lowering of the submarine plateau upon which Florida rests. This submarine plateau is not at the present time very much larger than the land area of Florida. The continental shelf does not extend very far offshore. In fact, along part of the East Coast, only a few miles from the beach the bottom breaks off into the abysmal depths of the ocean. Florida has tilted from north to south, so that large parts of it

have been under water for very long periods of time. Personally, I doubt whether *all* of it has ever been under water at any one time since the end of the Oligocene, say forty million years ago.

We know enough to paint, in a rather impressionistic way, those three pictures I have given: that of Florida in the Miocene, from information obtained at our now famous "fossil field," the Thomas farm; life in the Pliocene, from our visits to the phosphate fields and our rather shameless begging there, with what has been recorded in the literature; and finally, from our excavations in the area about West Palm Beach and inland from Melbourne and at Vero, the faunistic conditions in the Pleistocene, lasting down to what the geologist calls "recent" times, which nevertheless seem to the average man a mighty long time ago.

CHAPTER II

Bartram's Florida

WILLIAM BARTRAM'S *Travels* is one of the most fascinating books that I have ever read, although I became acquainted with it only about twenty years ago. Latterly I have learned much about William and his father, John Bartram, from my friend Dean Harold H. Hume of the University of Florida, who is so well known for his studies concerning the introduction and origin of the garden varieties of *Camellia japonica*.

John Bartram was born in 1699, a Pennsylvania Quaker and an avid and persistent explorer for plants. He spent a large part of his life collecting for his botanical garden at Philadelphia, the first of its kind to be laid out in America. He corresponded with botanists all over Europe, and shipped seeds and specimens to Peter Collinson in England; Collinson probably provided the money for some of Bartram's expeditions.

Bartram hunted plants over a large part of the eastern United States, traveling from New York to Florida. He was in Charleston in 1760, and again in 1763. He visited the city a third time in 1765, and on this occasion his son William, then twenty-six years old, went with him. The Bartrams continued on to St. Augustine, explored the St. Johns River country as far south as the latitude of

the present town of Titusville, and then struck westward to the region where the city of Gainesville stands now. Returning to St. Augustine, they took ship to Charleston and traveled overland to Philadelphia.

John Bartram's most famous single discovery was a beautiful flowering tree which he found near Barrington, Georgia, in 1765. His son William, who was much more a botanist and observer than a mere plant collector, named this tree *Franklinia altamaha* in honor of Benjamin Franklin. Bartram managed to get a specimen to Philadelphia, where it became established in his botanical garden. Specimens of this tree are growing today in many scattered botanical gardens, but every single individual stems from the stock brought home by Bartram. No living soul has seen *Franklinia altamaha* in the wild state since William Bartram saw it last.

Between 1773 and 1778, William Bartram explored Florida on his own account. He was infatuated with the beauty of the peninsula, which he saw in its primitive glory, and published an account of his explorations in 1791 at Philadelphia. This book is one of the most brilliant and absorbing descriptive pictures ever written. Reading Bartram's *Travels*, one can visualize the scenes which he saw, and relive days with him in camp. His descriptions of the Florida landscapes are charming beyond exaggeration. He pictures not only the vegetation which he came to know so well, but many birds and animals, and, above all, the Indians.

I believe that the passages which I am going to quote

from the *Travels* not only will show Bartram's power of narration, but will engender in any person who is not almost insensate, feelings of envy on the one hand and gratitude on the other.

> The extensive Alachua savanna is a level green plain, above fifteen miles over, fifty miles in circumference, and scarcely a tree or bush of any kind to be seen on it. It is encircled with high, sloping hills, covered with waving forests and fragrant orange groves, rising from an exuberantly fertile soil. The towering magnolia grandiflora and transcendent Palm, stand conspicuous among them. At the same time are seen innumerable droves of cattle; the lordly bull, lowing cow, and sleek capricious heifer. The hills and groves re-echo their cheerful, social voices. Herds of sprightly deer, squadrons of the beautiful fleet Siminole horse, flocks of turkeys, civilized communities of the sonorous watchful crane, mix together, appearing happy and contented in the enjoyment of peace, till disturbed and affrighted by the warrior man. Behold yonder, coming upon them through the darkened groves, sneakingly and unawares, the naked red warrior, invading the Elysian fields and green plains of Alachua. At the terrible appearance of the painted, fearless, uncontrolled, and free Siminole, the peaceful innocent nations are at once thrown into disorder and dismay. See the different tribes and bands,

how they draw towards each other! as it were deliberating upon the general good. Suddenly they speed off with their young in the centre; but the roebuck fears him not; here he lays himself down, bathes and flounces in the cool flood. The red warrior, whose plumed head flashes lightning, whoops in vain; his proud ambitious horse strains and pants; the earth glides from under his feet, his flowing mane whistles in the wind, as he comes up full of vain hopes. The bounding roe views his rapid approaches, rises up, lifts aloft his antlered head, erects the white flag, and fetching a shrill whistle, says to his fleet and free associates, "follow"; he bounds off, and in a few minutes distances his foe a mile; suddenly he stops, turns about, and laughing says, "how vain! go chase meteors in the azure plains above, or hunt butterflies in the fields about your towns."

Bartram rode across part of the savanna on horseback: —

We again came up to a long projecting point of the high forests, beyond which opened to view an extensive grassy cove of the savanna, several miles in circuit. We crossed straight over from this promontory to the opposite coast, and on the way were constrained to wade a mile or more through the water, though at a little distance from us it appeared as a delightful meadow, the grass growing

through the water, the middle of which, however, when we came up, proved to be a large space of clear water, almost deep enough to swim our horses, it being a large branch of the main creek which drains the savanna.

Proceeding about a mile farther, we came up to and crossed another brook, larger than the former, which exhibited the like delightful appearance. We next passed over a level green lawn, a cove of the savanna, and arrived at a hilly grove. We alighted in a pleasant vista, turning our horses to graze, while we amused ourselves with exploring the borders of the Great Sink. In this place a group of rocky hills almost surrounds a large basin, which is the general receptacle of the water, draining from every part of the vast savanna by lateral conduits, winding about, and one after another joining the main creek or general conductor, which at length delivers them into this sink; where they descend by slow degrees, through rocky caverns, into the bowels of the earth, whence they are carried by secret subterraneous channels into other receptacles and basins.

There was a mystical strain in the Bartram family which became, in William, a kind of pantheistic attitude toward natural creation. He found wild animals generally peaceful, and believed that the Indians he encountered were the moral equals of white men. Although his father's way of dealing with Indians was to "bang

them stoutly," the younger Bartram's descriptions of the Seminoles and Cherokees are unfailingly friendly and sympathetic. His book (its full title is *Travels through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the Extensive Territories of the Muscogulges, or Creek Confederacy, Soil and Natural Productions of these Regions, together with Observations on the Manners of the Indians*) was widely read in its own day, reprinted in England and Ireland, and translated into German, Dutch and French.

He wrote with descriptive power and his pictures of Florida catch the very atmosphere. See, for instance, this account of a tropical storm: –

> About noon the weather became extremely sultry, not a breath of wind stirring, hazy or cloudy, with very heavy distant thunder, which was answered by the crocodiles – sure presage of a storm!
>
> Soon after ascending this branch of the river, on the right hand presents itself to view a delightful little bluff, consisting chiefly of shells, and covered with a dark grove of red cedar, Zanthoxylon and myrtle. I could not resist the temptation to stop here, although the tremendous thunder all around the hemisphere alarmed me greatly, having a large lake to cross. From this grove appears to view an expansive and pleasing prospect. The beauteous long lake in front, about North East from me, its most distant East shores adorned with dark, high forests

of stately trees; North and South almost endless green plains and meadows, embellished with islets and projecting promontories of high, dark forests, where the pyramidal magnolia grandiflora, palma elata, and shady oak, conspicuously tower.

Being heretofore so closely invested by high forests and deep swamps of the great river, I was prevented from seeing the progress and increase of the approaching tempest, the terrific appearance of which now at once confounded me. How purple and fiery appeared the tumultuous clouds, swiftly ascending or darting from the horizon upwards! They seemed to oppose and dash against each other; the skies appeared streaked with blood or purple flame overhead, the flaming lightning streaming and darting about in every direction around, seemed to fill the world with fire; whilst the heavy thunder kept the earth in a constant tremor. . . .

On the opposite shore of the creek before me, and on the cape as we enter the lake, stood a large islet or grove of oaks and palms. Here I intended to seek shelter, and abide till the fury of the hurricane was overpast, if I found it too violent to permit me to cross the lake. In consequence of this precipitate determination, I stepped into my boat and pushed off. What a dreadful rushing and roaring there was every where around me! and to my utter confusion and astonishment, I could not find from what particular quarter its strongest current or direction

came, whereby I might have a proper chance of taking measures for securing a harbour or running from it. The high forests behind me bent to the blast; and the sturdy limbs of the trees cracked. I had by this time got up abreast of the grove or hommock: the hurricane close by, pursuing me, I found it dangerous and imprudent in the highest degree to put in here, as the groves were already torn up, and the spreading limbs of the ancient live oaks were flying over my head, and carried about in the air as leaves and stubble. I ran by and boldly entered the lake (being hurried in by a strong current, which seemed a prodigy, the violent wind driving the stream of the creek back again into the lake), and as soon as possible took shelter under the high reedy bank of the lake, and made fast my bark to the boughs of a low shrubby Hickory. . . .

Such was the violence of the wind, that it raised the waters on the opposite shores of the lake several feet perpendicular, and there was a rapid flow of water from the creek into it, which was contrary to its natural course. Such floods of rain fell during the space of half or three quarters of an hour, that my boat was filled, and I expected every moment when I should see her sink to the bottom of the lake; and the violence of the wind kept the cable so constantly extended, that it was beyond my ability to get to her. My box, which contained my books of specimens and other collections, was floating about

in her; and for a great part of the time the rain came down with such rapidity, and fell in such quantities, that every object was totally obscured, excepting the continual streams or rivers of lightning, pouring from the clouds. All seemed a frightful chaos. When the wind and rain abated, I was overjoyed to see the face of nature again appear.

It took me an hour or more to clear the water out of my bark. I then crossed the lake before a brisk and favourable breeze (it was about a mile over), and landed safely at the plantation.

The springs fascinated him, and he described them in detail: –

In front, just under my feet, was the inchanting and amazing crystal fountain, which incessantly threw up, from dark, rocky caverns below, tons of water every minute, forming a basin, capacious enough for large shallops to ride in, and a creek of four or five feet depth of water, and near twenty yards over, which meanders six miles through green meadows, pouring its limpid waters into the great Lake George, where they seem to remain pure and unmixed. About twenty yards from the upper edge of the basin, and directly opposite to the mouth or outlet of the creek, is a continual and amazing ebullition, where the waters are thrown up in such abundance and amazing force, as to jet and swell up two

or three feet above the common surface: white sand and small particles of shells are thrown up with the waters, near to the top, when they diverge from the centre, subside with the expanding flood, and gently sink again, forming a large rim or funnel round about the aperture or mouth of the fountain, which is a vast perforation through a bed of rocks, the ragged points of which are projected out on every side. Thus far I know to be matter of real fact, and I have related it as near as I could conceive or express myself. But there are yet remaining scènes inexpressibly admirable and pleasing.

Behold, for instance, a vast circular expanse before you, the waters of which are so extremely clear as to be absolutely diaphanous or transparent as the ether; the margin of the basin ornamented with a great variety of fruitful and floriferous trees, shrubs, and plants, the pendant golden Orange dancing on the surface of the pellucid waters, and balmy air vibrating with the melody of the merry birds, tenants of the encircling aromatic grove.

At the same instant innumerable bands of fish are seen, some clothed in the most brilliant colours; the voracious crocodile stretched along at full length, as the great trunk of a tree in size; the devouring garfish, inimical trout, and all the varieties of gilded painted bream; the barbed catfish, dreaded sting-ray, skate, spotted bass, sheepshead and ominous drum;

all in their separate bands and communities, with free and unsuspicious intercourse performing their evolutions: there are no signs of enmity, no attempt to devour each other; the different bands seem peaceably and complaisantly to move a little aside, as it were to make room for others to pass by.

But behold yet something far more admirable, see whole armies descending into an abyss, into the mouth of the bubbling fountain: they disappear! are they gone for ever? I raise my eyes with terror and astonishment; I look down again to the fountain with anxiety, when behold them as it were emerging from the blue ether of another world, apparently at a vast distance; at their first appearance, no bigger than flies or minnows; now gradually enlarging, their brilliant colours begin to paint the fluid.

Now they come forward rapidly, and instantly emerge, with the elastic expanding column of crystalline waters, into the circular basin or funnel: see now how gently they rise, some upright, others obliquely, or seem to lie as it were on their sides, suffering themselves to be gently lifted or borne up by the expanding fluid towards the surface, sailing or floating like butterflies in the cerulean ether: then again they as gently descend, diverge and move off; when they rally, form again, and rejoin their kindred tribes.

This amazing and delightful scene, though real, appears at first but as a piece of excellent painting;

> there seems no medium; you imagine the picture to be within a few inches of your eyes, and that you may without the least difficulty touch any one of the fish, or put your finger upon the crocodile's eye, when it really is twenty or thirty feet under water.

Bartram's vivid accounts of animals and plants, and especially of the manners and customs of the Indians, give his work great charm, and the *Travels* have, for years, been well known to naturalists and anthropologists. But the book did not acquire general recognition until 1940, when John Livingston Lowes wrote his introduction to a New York reprint. Professor Lowes described Bartram as "that rarest of combinations – the mind of a scientist with the soul of a poet"; and he showed how the *Travels* influenced Samuel Taylor Coleridge, as well as William and Dorothy Wordsworth.

Now I have been familiar with Bartram's book for years, and have a number of early editions in my own library. But until John Lowes pointed it out, I never dreamed that Bartram's "inchanting and amazing crystal fountain, which incessantly threw up, from dark, rocky caverns below, tons of water every minute, forming . . . a creek . . . which meanders six miles through green meadows," was the same "mighty fountain" which, in Coleridge's *Kubla Khan,* "flung up momently the sacred river. Five miles meandering with a mazy motion Through wood and dale . . ."

Thanks to Professor Lowes, we can compare the

natural phenomena observed by Bartram with their reflections in Coleridge's poetry. Naturally, Lowes's work put bibliophiles everywhere on the track of the *Travels*, and as a result the early editions are now very rare, fetching as much as $150 in recent sales.

CHAPTER III

Mounds

GRANDMOTHER'S house at Eau Gallie is situated right on the shore of the Indian River – which is not a river at all but a large and rather brackish lagoon. It is a queer old structure, really a double house. The front part is said to be the oldest building in Eau Gallie. Grandmother's bedroom and the sitting room are downstairs and there are two guest rooms upstairs. The front walk out to the lane passes under an arbor covered with Cherokee roses.

To the east, facing the river, there was a screened porch with an open porch directly above it. Beside the screened porch, where one might sit in peace during the mosquitoey seasons, there was more wide porch space connected with the separate dining room. Part of the open veranda downstairs extended around the trunk of a giant water oak which shaded the unroofed porch and a large part of the house. At the western door of the dining room was the cistern which provided drinking water, caught from our eaves. There are two artesian wells on the place, but the water from these is strongly sulphurous, though in time most of us grew to like it.

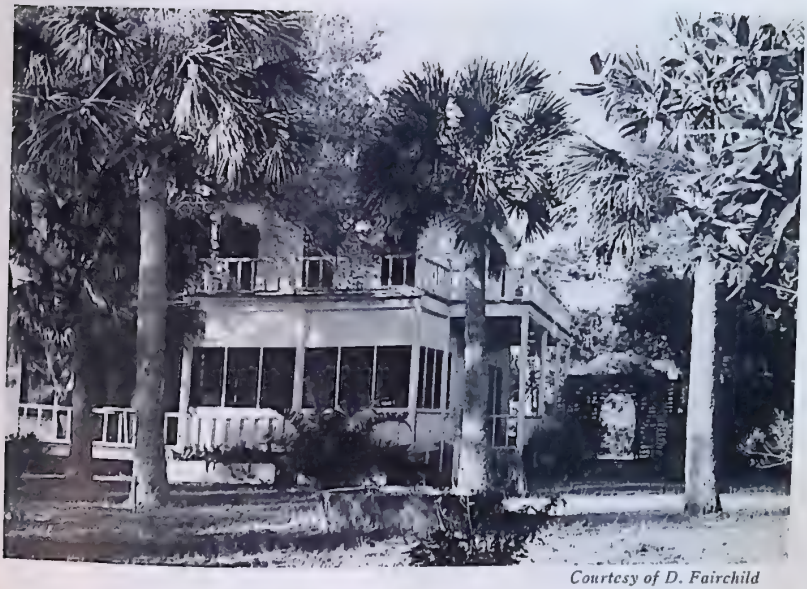
It was a picturesque dwelling place, beautifully cared for and planted out while Grandmother was alive – now,

however, sadly in ruins. For years there was a long wharf at the foot of the little grassy lane that bordered her property on the north. Here the old stern-wheel steamers which ran south to Jupiter from St. Augustine stopped on their irregular journeys down-river. To this wharf also was tied Grandmother's fishing launch.

In Florida at that time, few people had such a boat. The engine was made of solid bronze, for Grandmother hated the idea of sitting near a rusty engine, and she knew it would be that with the care it would get locally. Moreover, the engine was made so that it could be run very slowly for trolling. The Indian River had not been netted outrageously by commercial fishermen in those days, as it has been now, and it was no trick at all to catch a mess of sailor's-choice from the dock.

These were delicious little pan fish which might be sent to the kitchen or sometimes impaled as bait on a big hook and tossed far out from the end of the dock on a long line. There was always the good chance of catching an errant sergeant fish or snook, which might be cruising up or down the river well out from shore. These big fellows were white-meated and delicious to eat. You couldn't catch a big one now in the Indian River to save your soul — I mean one of fifteen or twenty pounds.

On trolling excursions with Grandmother, I usually went across the Indian River to the southern point of Merritt's Island, which was directly across the river from Walden, as Grandmother called her place. Merritt's Island,



Courtesy of D. Fairchild

Walden Cottage, Eau Gallie

Sarah Elizabeth Barbour and a friend on the veranda of Walden Cottage

something over a hundred miles long, lies in the Indian River, and that area of water lying to the eastward of the island is called the Banana River. Where the two so-called rivers met, there was an area of perhaps a hundred acres of really deep water for that part of the world, perhaps from fifteen to twenty-five feet. Here we trolled around and around, again and again. We used a hand line; Grandmother got more of a thrill without a rod.

I remember well the very first time I ever went there with her; I caught a sea trout, in reality an ally of our northern weakfish and, of course, not trout at all, which weighed just short of fifteen pounds. It jumped nobly when it struck, and I can feel now the sense of triumph as I landed it, although, in my opinion, the meat of this fish is decidedly inferior in quality.

On these trolling excursions we passed back and forth across the front of a great shell mound – thirty feet from the river shore to the top – which is located on the eastern shore of the Banana River, directly at its junction. I never saw this Banana River mound without its firing my imagination. It seemed so stupendous to my childish eyes. We often talked about how smelly the top of the mound must have been as a dwelling place, for of course the whole great accumulation was formed by Indians sitting around their campfires and for years unnumbered throwing the shells of the mollusks they ate over their shoulders, so to speak. There are little lenticular spots throughout the whole mound, which was certainly

several acres in area, and these lenses were the compacted remnants of age-old cooking fires. We know that primitive man is not very fussy about what he smells, but these mounds, during the process of their formation, must have been noisome in the extreme.

The Banana River mound was not very much higher or very much larger in area than the shell mound which belonged to Grandmother and which was but little over a mile south of Walden, where the Eau Gallie River enters the Indian River. On the rich surface of this mound, among enormous oaks and tall cabbage palms, which must have been very old, Grandmother's wonderful grove of old orange and grapefruit trees stood. They were apparently old seedling trees: they show no signs of having been budded; and how so many seedlings came to produce such superb fruit is a first-class mystery.

Once, however, before I ever tried digging there, I rowed myself over to the great mound at the mouth of the Banana River and by chance landed for a memorable day of sport. I must have been about twelve. I left my boat at the beach in front of the mound and trudged across through the scrub to the ocean. Naturally, on the way I examined carefully the bear tracks and the deer tracks in the sand, and finally reached the ocean beach after a walk of about a mile and a half. Then I uncoiled the long, heavy fishline which I had carried with me. I baited it with a sailor's-choice, taken from my pocket, and bent in a match stick to the line about six feet from the sinker and the bait. Catching this little stick with my

second and third finger, I would whirl the whole contraption around my head and heave it far out into the surf.

The sun was warm and the water caressed my bare feet. Suddenly I caught what to my eyes was the father of all channel bass and dragged it up on the beach. I beat its head vigorously with a club till it quit flopping, hitched a line to its tail, and slung it over my shoulder.

Thoroughly tired, I plodded back to the boat. As I was getting ready to row home I saw a fine big possum on the shore. He was traipsing about in broad daylight, which is no ordinary custom for possums. I ran him down and turned him over with one of the oars. With another line, which I had in the boat, I hitched him to a thwart by one of his hind feet. I rowed proudly home.

Grandmother was delighted at sight of the big fish, which we sliced up for broiling, reserving a good chunk for chowder. She spurned the possum, however, which went home that night with Aunt Harriet, ensconced in her covered basket. She was our cook and lived in "Colored Town" about two miles away, and this particular evening she went home with plans for fattening her trove before killing it. I can see her now as she puffed her little black T D pipe, walking along with a distinct hitch, for one of her legs was considerably shorter than the other.

During the early years of our married life, Rosamond and I had several happy visits to Eau Gallie and there we began our first amateur archaeological digging. We found

pottery sherds beyond number in the great Banana River mound. Directly behind it there was an even higher sand mound that must have been the burial place used by the makers of the shell mound for a very long time. The Peabody Museum still has many of the bones which we dug and one pretty fair skull. If, however, we had known as much then as we do now about caring for this sort of material, we should have had a much larger and much better collection. The bones were soft and punky, and many had been ruined by the penetration of roots of the trees and shrubs growing on the mound. Nevertheless, our digs were memorable occasions and they offered thrilling adventures and worth-while experience.

It has always been a mystery to me why this mound should have so abounded in fragments of pottery, showing several different designs, and other human implements such as shell cups and ladles, many fashioned from the big whelk shells. On the other hand, the mound at our grove proved to be unproductive. Grandmother was always very much interested in our digging activities and keen to see what we found. She helped find laborers to dig for us and frequently ferried us over and back from the mound. But none of Grandmother's old colored folk who worked around the place would ever go near the mound.

Mounds built of shells of marine species are characteristic of the coastal areas of most of Florida, whereas shell mounds composed of fresh-water forms are characteristic of the St. Johns River area particularly, and of lakes

The big shell mound at the mouth of the Banana River as it was in 1912

and streams of North and North Central Florida. The gigantic mounds, sometimes acres in extent and perhaps twenty or more feet deep, some even larger than our great mound near Eau Gallie, were to be found near salt water both on the East and on the West Coast of the state. Many have gone and others are fast disappearing. The shell was used in all road-building operations long before modern methods of road construction came to be practised, and shell still is carted away to be used for country roads, private avenues, paths, and sidewalks.

These mounds have furnished enormous collections of pottery and other human artifacts to many museums since Dr. Jeffries Wyman first read the account of his visit to the shell mounds of northern Florida before the Boston Society of Natural History on April 18, 1867. He said, "The age of these mounds was not determined but the occasional occurrence of live oaks, five feet in diameter, proved that the mounds had not been materially increased since the advent of the white man more than three centuries ago." As a matter of fact we know little or nothing of the people who made them.

The Indians in Florida today are not the Indians who were there when the Spaniards discovered the country. The early published accounts and illustrations give some account of the way the natives of that day appeared, but there is every reason to believe that neither the Indians of the present day nor even the Indians of four hundred years ago had any traditions or recollections which would

indicate that they knew anything about the prehistoric inhabitants.

On May 20, 1874, but a few months before his death, Professor Wyman communicated to the Boston Society of Natural History the fact that he found indubitable evidence of cannibalism practised by the early inhabitants living on the St. Johns River. He says: —

> In several instances considerable portions of the skeleton of a single individual were found but spread out over a large surface in a disorderly manner showing that the bones could not have been deposited as in the ordinary Burial. As there were no marks of teeth these bones could not have been supposed to have been broken up while lying on the surface by wild animals. . . . They were, besides, in the different instances broken up in a somewhat similar manner, the upper arm and thigh bones being fractured just below the heads and in the middle. Bones of the forearm and leg were generally broken through the middle and the ribs were broken into smaller pieces of nearly uniform length.

So much for Wyman's observations, which, as always, were carefully made and accurately described.

There has been a revival of interest in Florida archaeology during recent years, and, while nothing startling has been discovered, it is now clear that the cultural affinities of prehistoric Florida were with the West rather than the North. Here again, of course, we are not talking

of the Seminoles, but of the people who made the sculpture pottery which we find in the mounds. There is good reason to believe that these pottery fragments vary greatly in age, and it is possible that the mound at my grandmother's orange grove yielded no pottery because it was very early in origin. It may have been made by people who preceded the pottery makers.

The mound pottery is never polychrome, but the incised patterns indicate that the potters had developed considerable artistry. The designs used for ornamentation, and the shapes of the pottery objects themselves, differ in various parts of the state.

Skeletal material of the mound builders is abundant in many localities, but is not always well preserved. All too often, the bones have suffered from the roots of plants, which, seeking moisture deep in the sand, have penetrated and even enwrapped them.

I asked my friend Earnest Hooton whether our impression that the skulls of the mound builders were really characterized by being very thick, for so they certainly appeared to us, was correct. He replied, "The Florida mound skeletal material in the Peabody Museum, collected from the days of Jeffries Wyman onward, is extraordinary for massiveness. The skulls are thicker and heavier and usually broader than those of Seminoles. Morphologically they are quite distinct. Several of our mound crania show fusion of two or more molars — a rare phenomenon. They tend to be brachycephalic and usually are low of forehead and heavy of brow-ridge."

A few years ago Professor E. D. Merrill, Mr. Harold Loomis, and I visited that enormous mound at the southern end of Marco Island in southwestern Florida. This mound, which is one of the largest in existence, is composed almost entirely of great, heavy-shelled, hard clams — quahogs, we should call them in New England.

We walked about examining the cacti and other interesting species of plants characteristic of this area and fell to disputing among ourselves as to the probable age of these deposits. After considering the matter carefully and concluding that there was no likelihood that any great population of aborigines lived on Marco Island at any one time, we came to the conclusion that something in the order of twenty thousand years, at a minimum, would have been necessary to give rise to this enormous accumulation of shells. Our surmise regarding the population was based on the fact that we know of no place in the eastern part of the United States where native or aboriginal people were densely crowded together.

CHAPTER IV

Seminoles

THE INDIANS whom we call "Seminoles" today are of two groups. Both are immigrant stocks in Florida, where together they once occupied the whole state. These tribes are offshoots of the great Creek family, and while at first sight they look alike, they belong to two separate families, speak two different languages, and have little to do with each other.

After the long-drawn-out and incredibly expensive Seminole wars, the bulk of the Indians in Florida were gathered up and removed to the Indian Territory in Oklahoma, where, it must be admitted, they have done fairly well. But there was one band of men and women who eluded the United States troops for years, and, retreating farther and farther southward, finally maintained themselves and survived in the swamps. They have remained independent, refusing to have any dealings with the government of the United States.

It is that remnant of the tribe which one sees in Florida today. Years ago I often saw old men, and especially old women, turn their backs on me contemptuously when I attempted to speak to them, or stare at me with a cool indifference which made me feel completely ashamed of what has happened to these people.

Unprotected by any treaty with the United States Government, the Seminoles have been driven into the most inaccessible and inhospitable swamps of South Florida. There they were content as long as there was enough water for their great, beautifully shaped cypress canoes to carry them about. Then the swamps were drained, and the Indians were left with almost no canoe lanes, and nowhere to travel except along the roadside ditch beside the Tamiami Trail. Homesteaders drove them from newly drained groves and fields to which the Seminoles' only title was the fact that they had cleared the land, and planted it, and used it for unnumbered years.

With the supply of game diminished, the Seminoles were forced by hunger to fall back on alligators, coons, and such disgusting fish as gars and grindles, which at times are about the only fish that can be secured in any quantity in the ditches. A few very old Indians living near the Dania Agency have received rations to the value of ten dollars a month, and two widows with children received fifteen dollars monthly a few years ago; but unlike many Western Indians, the Seminoles receive nothing from tribal funds or from Federal allotments, nor from the sale or rental of real property.

Under such conditions, inevitably tribal organization and authority have gradually weakened. The young men and girls are tempted to join the "Indian villages," where they are made a show for tourists. They are fed, to be sure, but also plied with liquor, and it is an unfortunate

fact that these people have always been inordinately fond of alcohol. Venereal disease is, for the first time, making its appearance among the Indians.

For uncounted generations, the Seminoles have kept their blood very largely, if not absolutely, pure. I qualify this statement because, well within my own time, the Seminoles still had a few old Negro slaves who had been picked up as runaways before the Civil War. The women were taken into some of the chiefs' families, and some half-breed children resulted. But this small admixture of black blood is obviously disappearing. The last of the "slaves" was Hannah, who belonged to the family of Tallahassee and who lived until about 1900. There is no case on record where a Seminole woman has allied herself with a Negro man.

The danger of the Seminole nation is not the increase of Negro blood, but the attempts of meandering white hunters and vagabonds to force their attentions on the Indian women when their men are away hunting. In the old days, if an Indian woman produced a bastard child, she was killed forthwith, but today the Indians are rather afraid to enforce the tribal law, because ignorant white sheriffs and their deputies are glad of a chance to put an Indian in jail.

After being long and widely regarded as one of the most strictly moral groups of people in the world, there is danger that the Seminoles may not be so any longer. The old men and women are deeply concerned lest their children become drunkards and beggars. It is a pity that

the amusement parks which make a show of the Indians cannot be closed up by the Federal Government, but there is no way by which this can legally be done.

Despite the difficulties under which they live, the number of the Seminoles is increasing. In 1880, it was estimated that there were about 208 Indians; in 1930, there were 578; and today there are more than that. Lorenzo D. Creel, an able officer of the Indian Service, has reported that the Seminoles impressed him as alert and active mentally, with good memories and the acute power of observation which you might expect of Indian hunters. They will stand comparison with the average white man in the same environment, and Mr. Creel believes that, in comparison with other Indians, the Seminoles easily stand in the first class.

The Seminole house is a palmetto-thatched roof, pushed out well beyond the poles which support it. Beneath the roof is a platform made of poles, or sometimes of cull sawings from a lumber mill. Here the Indians hang their mosquito bars, under which they always sleep at night, and here the squaws sit cross-legged, working hour after hour with their most prized possession, a Singer sewing machine. Sleeping under a mosquito bar has probably helped the Seminoles protect themselves against malaria, but a great many of them suffer from this disease just the same.

An Indian camp usually consists of eight or ten of these thatched sheds arranged in a circle. In the middle of the circle is a larger, well-made, palmetto-thatched

roof under which pots, pans, and various provisions are hung out of reach of the dogs. The campfire burns steadily under this roof. The Indians build and maintain the best campfire ever devised. They search out and bring in well-seasoned pine logs, of a length several men can carry conveniently. These are arranged like the spokes of a wheel, and at the point where the ends of the logs come together, the fire is built. If it grows too hot, the logs are drawn back a bit; if more heat is needed, they are pushed in.

A big iron pot holding *sofkee* stands balanced over the fire on the logs, and today an iron frying pan or two is common. An enormous wooden spoon, carved in an invariable and characteristic pattern, stands up in the pot, and any member of the clan, old or young, is at liberty to help himself at any time. The basis of the *sofkee* used to be the arrowroot-like starch which is made from the coomtie plant. But the coomtie does not grow abundantly where the Indians are now forced to live, and grits is the ordinary substitute. The mess is flavored up with such wild meat as may be available. Turtles, alligators, gars, and the like are usually cooked in their shells in the fire.

Hunting and trapping are the Seminoles' principal occupations. They own some hogs and chickens, and since the women hold property in their own right, a wife often owns more hogs than her husband. The Okeechobee band of Indians, who have some fairly decent land in their little reservation near Brighton, own some cattle. In William Bartram's day, just before the American

Revolution, the Seminoles had big herds of cattle, and later Andrew Jackson, of sainted memory, is recorded to have stolen a thousand head from the "Mikasukis," as they were called then, in the region around Tallahassee.

The adult Seminole is personally clean. He bathes frequently. Crossing the country from Everglades to Miami in the early morning, I have often seen the Indian women washing themselves and their children in the wide, deep ditch beside the road. After long periods of drought, and when from lack of sufficient oxygen to support the occasional great concentrations of fish the dead fish pollute this water, the Indians are hard put to it for a decent place to wash themselves or their clothing. They usually have some little well or water hole from which reasonably decent drinking water may be procured; from the reports I have read and from what the resident physician at Everglades has told me, they do not suffer much from intestinal diseases.

Years ago, when I first saw the Indians, there were a good many old men who still wore the full tribal costume. Most conspicuous was the turban, beset with upright plumes or feathers. Old Billy Bowlegs was wearing one of these when I saw him at Okeechobee City in 1918. Today I don't think there is a turban left in Florida. Many of the men wear white man's pants with a brilliant Indian shirt made of strips of calico of all colors sewed together. But even now many of the older men wear the long, skirted shirt, belted at the waist and extending

Courtesy of Matlack Studio, Miami

The Seminoles of the early nineteen hundreds

Seminole debutante of the nineteen-forties

down about to their knees, made with the same gaudy pattern. They usually, I believe, go barefoot.

The women wear a skirt, mid-Victorian in its modesty, for it trails upon the ground. The skirt, too, is laboriously made of variously colored strips of cloth, with the strips sewed in circularly, never up and down. Almost any color is used, although fashions vary from time to time. The upper part of the body is covered with a circular cape which hangs down outside the arms, covering the breasts and falling a little below the waistline. Just at present a wide band of blue is fashionable for capes. A few years ago the principal color was yellow. But above and below the blue there are bands of various other colors. This costume is, of course, a tedious and time-consuming thing to make, but it is decorative and cool, allowing perfect freedom for the use of legs and arms. A group of young women running off through the tall sawgrass to meet hunters returning to camp is a gay and amusing sight.

The young girls do their hair over a great fanlike form which is arranged on one side of the head, not straight up and down, but slanting. This is supposed to be a convenient eyeshade against the sun's rays. I suspect that it is in reality the last word in recent fashion and considered extremely fetching. It is still the custom, as I imagine it has been since time immemorial, for women to wear string after string of colored beads around their necks. These beads are heirlooms and very much prized, but must be an awful nuisance, for I am sure some of

the more aristocratic young women carry in this way a weight of twenty pounds or more. The children, as soon as they can walk about, are usually dressed as their parents are, in miniature.

A good many Indians now own old, broken-down Ford cars, although oxen and wagons are used in the back country still. Continued drainage limits the journeys which they can make with their great dugout canoes, but the cutting down of all cypress trees big enough to serve for canoe building would have ended this method of travel sooner or later, even had there been no drainage. Indians have often told me that they have no recollection concerning the age of the canoes which they own. This may not be an exact statement of fact, but it is well known that if cypress is well cared for it will last a very long time.

Some years ago, the Bishop of South Florida established Miss Harriet Bedell as deaconess in charge of the Glade Cross Mission, to work with the southern group of independent Seminoles. These people are generally known as "the Big Cypress Band," to distinguish them from the Okeechobee Indians and "the Cow Creek Band," which has settled down about the agency at Dania. Miss Bedell, whom I have known for years, is a hard-boiled realist. She has helped the Indians get medical care, and has taught them a lot about personal and camp hygiene, and child care. She has encouraged them to do better work at wood carving, basketry, and the manufacture of other objects of various sorts, which

she has sold for their benefit. She has persuaded them to set up booths along the Tamiami Trail, where their dolls and baskets are sold to passing tourists. The very fact that these articles were sold, and at good stiff prices, too, helped the Seminoles' self-respect and made them feel that they were putting off the day when they might have to become objects of charity. Of course they are having a very hard time now, since no tourists travel the roads.

These Indians were never pottery makers, so far as I know, as were the people who made the shell mounds. They did make a powerful bow of characteristic form; Miss Bedell got one of the very old men living near Immokalee to make one for the Peabody Museum. She also procured for me one of the last mortars for mashing Indian corn, which, with its giant pestle, is preserved in the Museum. Now the Indians usually use a coffee grinder. They make baskets of several sizes and shapes from the young leaves of the palmetto palms, and also sieves, which were originally used in connection with making coomtie starch. Rosamond and I collected a number of baskets from some of the old squaws living at Indian Town twenty-five years ago. These women are all dead now, and I am afraid not much basket making is being practised at this time.

Miss Bedell writes me that the Indians don't like to make men dolls because hands and feet must then be made; since the women wear skirts to the ground and keep their hands under their capes, these do not have

to be carved. "One day some friends of mine asked why they did not make hands and feet on the women. An Indian girl replied, 'Indian woman no show her feet, no show her hands, and we no make 'em.' One day the women bringing in dolls were reproved for not making men dolls. An old woman with them said something in Indian. When we asked what she said, a girl replied, 'She say all the girls don't have boys.' The old men are adept with the knife and are used to carving models of their dugout canoes and are beginning to make carved bowls, bag handles, napkin rings, book ends, and even carved busts which are quite good replicas of themselves." The Indians have always had a difficult time during the summer. Now life is difficult for them all the time since travel is so restricted. The proposed Everglades National Park project has aroused suspicion that the Indians will be driven from their villages along the Tamiami Trail, which unfortunately has caused unrest among them. I had always hoped that some arrangement might be worked out where the Indians could be used as park guardians, and if the Park ever comes into being I have thought some way may be found whereby the interests of the Indians may be protected. These people have never sworn allegiance to our flag and some consideration should be given to the fact that their sturdy independence of character entitles them to special consideration.

The Seminoles have not always hated all white men. There have been a few whom they trusted, whose houses they would visit, and whom they would ask for advice.

A few years ago, I was surprised to meet a handsome, upstanding Indian of middle age, whose name was Cory Osceola. Indians have two names, one used among themselves and usually unpronounceable by us, and another which they choose for their dealings with white people. This man had chosen to perpetuate the name of Charles B. Cory, a good friend of the Indians, whose book, *Hunting and Fishing in Florida*, first aroused my interest in the Seminoles. The family name of Osceola is that of the great Seminole chief, whose story is told by Minnie Moore Willson in *The Seminoles of Florida.* She quotes "an old Florida settler": –

> "He was a great man, and a curious one, too; but few people knew him well enough to appreciate his worth. . . . He was a brave and generous foe, and always protected women and children. An act of kindness was never forgotten by him. Osceola had received a favor from one of the officers who led the battle of the Withlacoochee. Observing him in the front ranks, he instantly gave orders that this man should be spared, but every other officer should be cut down. Osceola's father was an English trader named Powell, and his mother the daughter of a chief known as Sallie Marie, a woman very small in stature, and with high cheekbones. Osceola lacked this peculiarity, and was one of the finest-looking men I ever saw. His carriage was erect and lofty, his motion quick, and he had an air of hauteur in his

countenance which arose from his elevated pride of soul. . . .

"I tell you, he was a great man; education would have made him the equal of Napoleon. He hated slavery as only such a nature as his could hate. He was Indian to the heart, and proud of his ancestry. He had too much white blood in him to yield to the cowardly offers of the government, and had he not been captured, the Seminole War would have been a more lasting one than it was." "Did the Indians take scalps?" "Take scalps? Well, yes, if Osceola wasn't around. He was too much of a white man to allow it himself."

Mrs. Willson continues: —

The admixture of Caucasian blood stimulated the ambition of Osceola's Indian nature; his education together with the teachings of nature, made him able to cope with the most learned. . . . His youthful mind received deep and lasting impressions from Tecumseh's teachings. To these teachings, as well as the blood he inherited from his Spartan ancestors was due, no doubt, his supremacy in the Seminole War. In the manner in which he led the Seminoles may be seen the influence of the great Shawnee.[1]

[1] As a glimpse into Indian character, it is worth recalling that Tecumseh, the Shawnee Chief, rose to the distinction of a Brigadier General in the British Army under King George III, in the War of 1812.

Osceola's power was in his strong personal magnetism; he swayed his warriors with a look; a shout of command produced an electric effect upon all. He was a hero among his people, he was feared and dreaded by our officers. . . . Talk after talk with the Indians was the order of the times. It was at one of these meetings that Osceola . . . attracted attention by saying, "This is the only treaty I will ever make with the white," at the same time drawing his knife and striking it into the table before him. The cause of this outburst was that the stipulations of the treaty guaranteed no protection to the allies. He was arrested for his insolence, but was released on a compromise. His vengeance became more terrible than ever . . . and "war to the knife" was resumed. It was now that the daring chief made the bold and well-conducted assault against the fort at Micanopy. A short time after, this savage hero performed a piece of strategy before unheard of in the annals of war. Surrounded by two armies of equal strength with his own, he carried away his warriors without leaving a trace of his retreat. That host of Indian braves melted out of sight as if by magic, and our disappointed generals could not but agree that a disciplined army was not adapted to the work of surprising Indians. . . .

After months of warfare, a conference among the Indians with a view of a treaty of peace was held. An Indian chief was sent to the American quar-

ters. . . . He approaches our General . . . and presents him with a white plume plucked from the egret, with a message from Osceola, with these words, "The path shall be white and safe from the great white chieftain's camp to the lodge of Osceola."

General Hernandez immediately despatched Coacoochee [who was the messenger. – T.B.] with a pipe of peace, kindly messages and presents.

. . . Osceola, in company with Wild Cat [Coacoochee] and other chiefs, accepted the truce and under the sacred emblem of the white flag, met General Hernandez on October 21, 1837, at St. Augustine. . . .

. . . As the officers approached, they asked of Osceola: "Are you prepared to deliver up the negroes taken from the citizens? Why have you not surrendered them as promised by your chief Cohadjo?"

According to history, this promise had been made by a sub-chief and without the consent of the tribe. A signal, preconcerted, was at this moment given and armed soldiers rushed in and made prisoners of the chiefs.

An account of this violated honor, recently given by the venerable John S. Masters, of St. Augustine, Florida, is opportune at this point. The old soldier in speaking of the affair said, "I was one of the party sent out to meet Osceola when he was coming to

St. Augustine under a flag of truce." "Did you honor that truce?" he was asked. "Did we? No, sir; no sooner was he safe within our lines than the order to seize him, kill if necessary, was given, and one of the soldiers knocked him down with the butt of his musket. He was then bound and we brought him to Fort Marion and he was put in the dungeon. We were all outraged by the cowardly way he was betrayed into being captured."

. . . Osceola with the other chiefs was confined for a short time in St. Augustine, but the daring savage was too valuable a prize to trust on Florida territory, and he was taken to Fort Moultrie where he died January 30, 1838, at the age of thirty-four years.

It is related that Osceola on being questioned as to why he did not make his escape, as did some of the other chiefs from Fort Marion, replied, "I have done nothing to be ashamed of; it is for those to feel shame who entrapped me." . . .

Thoroughly and thrillingly dramatic was the death scene . . . of Osceola as given by Dr. Weedon, his attending surgeon. "Confinement no doubt hastened his death, and his proud spirit sank under the doom of prison life. He seemed to feel the approach of death, and about half an hour before the summons came he signified – he could not speak – that he wished to see the chiefs and officers of the post. Making known that he wished his full dress,

which he wore in time of war, it was brought him, and rising from his bed he dressed himself in the insignia of a chief. . . . With the death sweat already upon his brow, Osceola lay down a few minutes to recover his strength. Then, rising as before, with gloom dispelled, and a face agleam with smiles, the young warrior reached forth his hand and in dead silence bade each and all the officers and chiefs a last farewell. By his couch knelt his two wives and his little children. With the same oppressive silence he tenderly shook hands with these loved ones. Then signifying his wish to be lowered on his bed, with slow hand he drew from his war belt his scalping knife which he firmly grasped in his right hand, laying it across the other on his breast. In another moment he smiled away his last breath, without a struggle or a groan. In that death chamber there was not one tearless eye. Friends and foes alike wept over the dying chief. Osceola died as he lived – a hero among men.

OSCEOLA — PATRIOT AND WARRIOR
DIED, JAN. 30, — 1838.

Such is the inscription, that marks the grave of the hero of the Seminoles."

A detachment of the United States troops followed by the medical men and many private citizens, together with all the chiefs, and warriors, women and children of the garrison . . . escorted

the remains to the grave, which was located near the entrance to Fort Moultrie, Charleston Harbor. A military salute was fired over the grave and as the sound reverberated over the dark waters of the bay, Justice and Patriotism, must have pointed with fingers of scorn to our great Nation.

CHAPTER V

The Norther and the Hurricane

EVERYONE thinks of Florida as a land of sunshine and delight. I was about to say "a land of fruit and flowers," when I remembered the cynic who said, "Yes, fruit on the inside of the can and flowers on the outside." But that was really unfair. The fact that in Florida the weather is of such insistent concern can no doubt be traced to the norther and the hurricane.

The climate during the winter is as near perfect as may be found anywhere. I am an early riser and I see the mornings begin with the sun literally jumping from the ocean – it rises so fast and lights up so quickly the great white billowy castles of cumulus clouds which stand over the Gulf Stream in fantastic confusion. Here there is no rosy-fingered dawn but rather a bold, brave sun which strikes the clouds in an instant and then burns through to light up the land. A dawn of this sort presages a normal day with a cloudless sky. The southeast trade wind arises between nine and ten o'clock and blows all day long, so that even if it is hot in the sun one may step into the shade of the breezeway and be comfortable in an instant.

But once in a while comes a day when the trades do not begin to blow, when it gets hot and increasingly breathless as the hours pass. One feels that something queer is going to happen. Sometimes there comes a dark, pelting rain of several hours' duration, at other times hard showers, with perhaps a dreary mizzle in the intervals between. Then watch the flag: you see that the wind has changed from southeast to south, and so on to southwest – and then sometimes, almost in the twinkling of an eye, the wind jumps to the northwest and a "norther" is upon us.

There have been years, though rarely, when northers came with dreary frequency; but generally they are limited to one or two during the season. They extend surprisingly far south and they may even be felt to the coast of Costa Rica. For one who suffers from seasickness, to be caught by a norther between Key West and Havana is acute suffering. I know, for I've had singular ill fortune in this connection.

At their very worst, northers bring the "freezes." Warning of those terrifying phenomena is now announced on the radio, and at once everyone who owns a plant prepares to sit up all night watching the thermometer as it drops degree by degree until it reaches 32°. In the yard, the little white blossoms on the weeds of the old maids' pins (Bidens) shrivel at this temperature. If this happens only a short time before dawn, with the rising of the sun the temperature recovers and little harm results. The coldest period of the whole night, curiously

enough, is just before dawn, not during the midwatches.

At long intervals come those devastating freezes, of which the worst that I remember was that of 1898. A sharp cold snap early in the season defoliated the orange trees and killed a good many tender garden plants. This was followed by over a month of unusually warm weather. The citrus groves recovered, growth was lush, the trees were loaded with a heavy bloom. Then nature struck again and this second terrible "spell" froze the trunks of the trees, filled as they were with sap. The trunks of the trees were literally shattered and rent asunder. Afterwards great areas of the state were for years abandoned; orange growers moved farther south, where they were relatively free from any danger of frost until the wholesale drainage program began, draining the warm water from the face of the land and so bringing on a new man-made danger. I remember after the Great Freeze my grandmother attempted to install tents which were contrived so that one might open or shut them — or drape them around, rather — to shelter tender trees. But this notion proved impracticable: they were carried off with heavy winds or soon rotted in the rain.

Now, freezes come more frequently than they did years ago. Indeed in 1943 we had two little snaps when for a few hours it went to 29° F., enough to ruin thousands of acres of tomatoes, peppers, beans and eggplants. Harm is not done to the citrus groves on the scale of years ago for the simple reason that the whole industry of citrus cultivation has moved southwards. There once

were big old groves around New Smyrna and St. Augustine, and in the grounds of the Experiment Station at Gainesville are stumps still standing of big old orange trees five inches in diameter. But the lake region of the middle part of the state, where the undrained bodies of warm water provide protection, and the Indian River region stretching along the middle East Coast, now produce the great bulk of Florida's oranges and grapefruit. There, the big growers carry piles of "fat pine" logs in among the trees and scattered fires are made when the threat of frost is announced. Others use smudge pots for burning oil. It is surprising what a very little smoke will do to prevent a damaging freeze.

In spring, as hot weather comes, it is the early hours of the morning which are most uncomfortable. This is quite the reverse of these southern climes where the freshness of dawn is enjoyable. Here in South Florida along the coast, for two or three hours after sunrise the air is so moist that before the sun's rays and the rising breeze dissipate this moisture it can be as uncomfortable and disagreeable as anywhere in the tropics. The interior of Central and North Florida is usually very hot at all times in summer.

At such times come the thunderstorms, and some of them are extraordinarily impressive examples of what nature is capable of doing when she attempts to "show off" and to stage episodes calculated to strike really considerable terror into a good many hearts. I recall a storm several years ago in late spring, when the drumfire of thun-

der was continuous for over forty minutes by my watch. The rain fell in stinging squalls, but not a trace of lightning was to be seen. Apparently the bolts were flying back and forth high in the atmosphere between different layers of clouds and were not reaching the earth at all. At least this was the only explanation which David Fairchild and I could figure out – for the thunder was as deafening as thunder ever could be, and we should certainly have seen the lightning had it been snapping about us.

The hurricanes hit in the summer, sometimes two or three times in one year, sometimes at intervals separated by a number of years. The strange color in the sky and the distinctly portentous feeling which comes over one, foretelling their advent, often make unnecessary the elaborate series of warnings given on the radio to "board up the windows and make everything fast." The wind velocity in these storms reaches very high rates of speed indeed. The short gusts – little storms within the main tempest, so to speak – may blow at 180 m.p.h. I saw one once when the royal palms, which could not bend before the blast of the wind, stood straight and stiff until their giant crowns of leaves were snapped loose; then they went bounding off like great tumbleweeds. Sheets of galvanized iron from the roofs of the houses blew along until they hit the trunk of a giant tree; then the sheets of heavy metal wrapped around it as if they were wet tissue paper.

A friend of mine, watching a first-class hurricane from a safe chink in a wall through which he could peek safely out into a street of San Domingo City, once saw a metal electric icebox go rolling and hurtling along as if it were made of cardboard; a few years afterwards, in this same place, Rosamond and I saw a short piece of sawed timber, about the size of a two-by-four board, blown by the wind so that it pierced the trunk of an enormous palm tree. I have heard of straws being driven through the steel beams of bridges by the wind, but suspect that story may be a bit apocryphal.

Such hurricanes have been extraordinarily effective in distributing certain forms of plant and animal life. It doesn't seem possible that there can be any other explanation for finding tree snails of the genus Liguus in both Cuba and Florida, nor are these tree snails the only ones which are probably so distributed. Mr. W. J. Clench, Curator of Mollusks in the Museum in Cambridge, tells me that a careful count reveals seven species of land snails in the Keys which are pretty certainly derived from the Bahamas. Beside the tree snails of which I have spoken there are also in Florida two other genera obviously of Cuban origin, besides five probably from Yucatán, and three or four others which may have come from Mexico or elsewhere.

But this is a puny illustration compared with what the hurricanes have been able to do with plants. A very large number of West Indian plants are found in South Florida as I shall tell later. As distribution by ocean currents from

the West Indies would involve a long and rather improbable voyage entirely around the island of Cuba, it is fair to assume that hurricanes have played a very great part in bringing them to Florida.

Why do not the hurricanes distribute bats? There are almost no bats in a large area of South Florida. There are some undercut limestone caves – not particularly high, and forming shelters not very deep or very dark, – caves which in Cuba or the Bahamas would certainly harbor bats. These are some miles south of Palm Beach, between the ocean and the inland waterway. I have visited them a number of times and have never seen a bat. Moreover, the species of these animals inhabiting Cuba, Jamaica, Hispaniola, Puerto Rico and the Bahamas are very great, yet the degree of endemism is high – that is, each island has many genera and species peculiar to its region and not found elsewhere. Many of the Bahama Islands have areas of raised limestone high enough so that caves of considerable size have been formed, and by chance there are a number of other spots in the islands particularly suitable for harboring large colonies of bats – for example, the dark underground passages, magazines and dungeons in the old forts at Nassau on the island of New Providence.

Most of the species in the Bahamas are relatively late flyers and one does not see there that extraordinary sight so often visible in Cuban cities – where, half an hour or so before sundown, the whole area is alive with the various little species of free-tailed bats, or Molossoids. Most

of these live under the tiles of old roofs and seem unable to wait for darkness, but come swarming out with much chittering and bickering, each one trying to get past the others as they scramble to take off and launch themselves into the air. They fly with extraordinary speed, too. Most of them apparently stay out most of the night, though some individuals come back for a few hours during the midwatches of the night and then make another foray just before dawn. They return for good at just about the time when you can see to read your watch.

Now is it not strange, considering the enormous numbers of these creatures, which are in the air for many hours out of each twenty-four-hour period, that their more even diffusion has not been brought about by the innumerable hurricanes which have taken place since, let us say, Pliocene times? Is it that the bats are so intelligent that they seek shelter before the storm comes? Is it that they are killed by the violence of the tempest? Or what *is* the reason that all of this long list of peculiar species of bats are found each on its own particular island and nowhere else?

There are certain birds which appear regularly each year in South Florida, such as the scissor-tailed kite, the gray kingbird and the white-crowned pigeon. The origin of this habit may be the fact that they first learned their way to Florida, so to speak, by hurricane dispersal. This is by no means certain, nor is it an assumption which is possible to prove. On the other hand it is by no means

impossible. In the case of these birds, again, it seems strange that the number of species should be so limited.

There is another feature which is very difficult to explain. Why are there not species of land mollusks on the Keys in the same relative abundance of forms which one finds in the Bahamas or Cuba? The limestone is the same, and the climate and rainfall are essentially the same; but being very low, the Keys may be more subject to salt-water inundation during the great first-class storms. Still this should not be lethal to enormous numbers of forms in which the entrance to the shell, which if open might have exposed the delicate animal to salt water, is in fact closed by what we call an "operculum" — a little circular disk either of limy deposit or of a horny nature, which closes the aperture very tightly. Many insects which we see here in South Florida every day have certainly been derived from lands to the south of us. But again what seems to me remarkable is not that these creatures exist but rather that there are not enormously larger numbers of them.

What I have said here I think makes clear the extraordinary disparity in the number of species of animals as compared to plants which have invaded Florida from the tropics. Roughly speaking, there are nearly a thousand plants in Florida which came in from the West Indies, and since they have had to cross the Gulf Stream it is extremely probable that hurricanes have been the moving force. The surprising fact is that so few animals, vertebrate or invertebrate, have come by the same route.

CHAPTER VI

Forests and Fire

TIME and again I have thought how extremely fortunate it is for those of us who love unspoiled nature to have been born today – and not a hundred years hence. The speed with which the world is changing, indeed with which the world is being ruined from the naturalist's point of view, is accelerating so that what is left for the naturalist of the future will be a poor imitation of the country which we have seen and loved. Who in 1935 would have dreamed of jeeps bumping over the Owen-Stanley Mountains in New Guinea? Or of military operations on a crushing scale in the Solomons and New Britain, in the Marshall and Caroline Islands, in the New Hebrides, and in hosts of other simple and primitive regions?

The swiftness with which the forests of the tropics are being destroyed would be a wonderful demonstration of man's power were it not so tragic. Air fields scattered over all Amazonia . . . forests being cleared in Central America, in Central Africa, in the far Pacific, as fast as men with their axes can work. . . .

In the spring of 1944 Ludlow Griscom went to Louisiana to see what the chances were of saving the last great stand of cypress, and of preserving what are certainly

the last existing pairs of the magnificent ivory-billed woodpecker.

I awaited his report fearfully, and was not surprised when he said: "The whole area is full of portable sawmills. You can't get away from the sound of tractors hauling out logs. It is too late. It can't be done." Thus the last stand of big cypress in North America goes down. The Forest Service and the National Park Service have done a noble work, but the best they can expect to save are samples. Better than nothing, to be sure; but you know and I know that the pressure to make use of their relict forests, say fifty years from now, will with little doubt be too great for any political administration to oppose.

The Everglades were never, as our school geographies depicted them, lush forests with serpents hanging from the branches. They were, and are, vast areas of saw grass which once grew in shallow water with scattered heads and hammocks; these hammocks were restricted areas of slightly higher land covered with bay, myrtle, and sometimes oaks and palmettos. They were thousands of charming little dells which have now been destroyed in large part by the myriad fires which followed the draining. For untold ages the Indians cruised back and forth over this country in their dugout canoes. They had their gardens of squash and corn on the higher land, or rather they had them until their little farm grounds were homesteaded by some unscrupulous white man. Now these farms in many cases have also been burned.

The result to the Indians has been an undeserved major tragedy.

America is proud of her magnificent record in road building, but nothing has been so destructive of wild life as our good roads. I motored a few years ago from Lordsburg, New Mexico, to Tucson, Arizona. The number of animals which had been killed by motorcars was a terrific shock to behold – not that any of them was valuable individually, but the mass slaughter which had happened was appalling. In New England each autumn skunks have a period when they seem to be affected with a sort of wanderlust and then, being fearless or stupid, I know not which, they are killed on the highway in great numbers. Thus in time they will go the way of the box tortoise on Cape Cod, Long Island and New Jersey. In Florida, once, if you drove from Melbourne to Kissimmee in bright sunny weather you would always see from two to a dozen box tortoises warming themselves on the black tarred highway. You rarely see one, now. Of course in Florida the slaughter of reptilian life on the roads has been devastating, and the reason is clear. There are cold spells, sharp northers, bringing the temperature down to frost or to near freezing. Normal temperatures return in a few hours and then the snakes and tortoises creep out on the black tarred road to warm up. There they have been killed literally by millions. I mean what I say and am not exaggerating, for Florida is a very large state.

In the 1920's as I cruised out around Palm Beach in my old Model T beach wagon I often saw deer and turkeys

and sand-hill cranes, and collected reptiles along the roads, where now there is nothing but occasional opportunities to examine what I call "sucker traps" – synthetic archaeological diggings or salted fossil finds "exhibited" to the ignorant at twenty-five cents a head. To these must be added the innumerable barbecues, indoor eating places, fruit stands and what-have-you. The pity of it is that most visitors believe that this is Florida. They do not know that there are enormous areas in the state where natural beauty may still be found.

If you think I have been exaggerating let me quote a few lines from a little book called *From Eden to Sahara – Florida's Tragedy*, by the late Dr. John K. Small,[1] a principal authority on the flora of this state. In speaking of a stop he made for the purpose of collecting plants at one point on the eastern shore of Lake Okeechobee, he writes: –

> Here we were again very forcibly impressed with the terrible destruction which is returning Florida to its primitive geological condition, namely a barren desert. *Drainage and Fire!* The two processes are tending to eliminate all native life from the state. We made incursions into the remains of the old marginal hammock of the lake. This hammock has been referred to both in its virgin condition and after it had been ravaged by the axe and fire. The

[1] Privately printed, 1929, Science Press.

wanton destruction continues! We walked through the skeleton of the hammock. The once deep humus was gone. In its place white sand met the eye. Even the ashes of the humus had been washed away. Some of the giant cypress trees (*Taxodium distichum*) were prostrate, some were standing, either dead or alive, but only to emphasize the almost complete destruction! Where the root-systems of the big cypress trees were once buried in several feet of humus so spongy that one could only walk in it with difficulty, not a bit of humus remained. The root-systems, with their accompanying "knees," stood anchored only in sand, and one could crawl or even walk through the network of once subterranean branched roots. Thus the magnificent monument that took ages to construct has been wrecked within the fraction of a generation!

I read this passage recently to David Fairchild, and his comment troubled me: "That's nothing to what I saw last summer when I was in Colombia. I found that clearings for cattle pastures had been carried on to such a point that the forests had been completely destroyed, the torrential tropical rains had given rise to serious erosion, and the humus was being carried away from large areas. Vast sections of this once fertile and lush land were in immediate danger of becoming deserts."

I remarked that we had seen something of this same

sort when motoring inland from Majunga in Madagascar a few years ago.

"Have you read Humbert's book?" he asked, and without waiting for an answer he took down the book from the shelf in his laboratory where we were sitting. The picture of the destruction of forests which Humbert paints in his *Madagascar* amplifies my own more superficial observations.

At this point David added, "You've been to Dakar?"

I said, "Yes; and you've been to Gambia."

That part of West Africa has suffered the destruction of its forests, as have the native reserves and all of South Africa except relatively small circumscribed areas in Pondoland, and adjacent territory where attempts are being made to save some of the Knysna and Tsittsikama forest regions – thus far without much success.

In Sumatra the devastation resulting from the invasion of cogon grass and the repeated burning has been truly described by David. In *The World Was My Garden* he writes: –

> Mr. Brandts Buys wanted us particularly to see the stands of Merkus pine, as he was working on the theory that vast forests of it could be developed in these Sumatra highlands, and since it is an excellent turpentine producing species this would add great wealth to certain mountain regions of the Dutch East Indies where little that is of value is now grown. His first problem was to check the fires and

stop the encroaching tall grasses which are the destroyers of the pine forests. These two agencies work together in an association more perfect than many of the "symbioses" of field botanists. Grasses alone cannot destroy the forest, but combined with fire they are destroying it everywhere. Let grasses start at the edge of the forest where they get enough sunlight, then if they catch fire in the dry season the trees on the edge of the forest will be burned, and into this fringe of dead leafless trees the grass spreads with the next wet season. Repeat this process for centuries and the lands capable of supporting the trees will become grasslands.

Nowhere have I seen more striking demonstrations of this phenomenon than here in the jungles of Adjeh, in Sumatra. By grasses I do not mean the blue grass which the colored man cuts from your lawn every month. I mean grasses as high as your head, grasses that make so thick a carpet on the ground that seeds dropped from the trees cannot get through, grasses that you could grub out every week from the ground and that would grow again where you had thrown them to die. Grass is the curse of the tropics, as every planter will tell you. Shading it out with other plants seems to be the only method of combating it.

So it seems, now, that no corner of the world is exempt from the terrible effects of man's wastefulness. It is not

Florida alone which has suffered, although it has been more unkindly treated perhaps than any other of these areas which I have mentioned, scattered as they are over the face of the whole earth. The truth of the matter is that natural scenery, especially in the form of forests, is disappearing from the face of the globe, at an ever-accelerating rate; and the time is not far in the future when man will be living in a treeless world – living as they live in China today, where you may see the women combing the surface of the rivers at flood – for anything, even for straw, with which to build a fire.

Whether all of China was once forested is difficult to prove today. That some of it was covered with trees is, however, entirely certain; and nowhere is the result of wholesale deforestation more evident than over the vast areas of Cathay.

I deeply regret that Bartram left us no word pictures of the flat pinewoods of Florida. He must have seen those piney woods at their very best. They were more picturesque and more interesting than were the flatwoods of South Carolina and Georgia, for they were more varied and differed widely from one part of the state to the other. The Florida flatwoods are studded by thousands of prairie ponds – some mere shallow pans in the sand, full of needle grass and button bushes, inhabited perhaps by a single pair of sand-hill cranes; others great lakes of many square miles in area.

In the interior woods the slash pine was the typically

dominant tree, while stands of long-leaf pine occurred over enormous areas of the level and relatively well-drained country of eastern Florida. In the south, these species are replaced by the Cuban pine, locally known as "the Dade County pine." This grows right on the bare rock.

All of these pines are remarkably resistant to fire; even quite young trees may be defoliated by a blaze, yet within a few weeks shoot forth to start growing again. For this there are two reasons. In the first place, the bark is particularly thick. In the second place, since most of the lands have been burned over again and again, the fire travels fast. It does not linger to consume. This, of course, is not the case where the trees have been "boxed" [1] for turpentine and where the cutting allows the fire direct access to the sapwood.

Between boxing for turpentine and cutting for timber, these vast areas of the flatwoods which were so grand and inspiring to see when I was a youngster now are hopeless deserts. I should not even dare to guess from how many thousands of acres the trees have been cut, with few or no individuals left to produce seed. Hence few or no young trees are growing up.

One might suppose that the piney woods of olden days were monotonous in the extreme. This, however,

[1] The word signifies the way the bark is removed over a larger and larger area, farther and farther up one side of the tree — so that a fresh bleeding surface of the resin-bearing layer of wood is exposed again and again.

was by no means the case. The individual trees, which averaged ninety feet in height, were magnificent — picturesque in shape, and infinitely varied. Beneath and among these pines were scattered clumps of saw palmettos, from a few yards to many acres in area. Between these palmetto and gallberry clumps was grass — besprinkled with Zephyranthes lilies in some regions, elsewhere with purple and white terrestrial orchids. Other places displayed lovely upstanding clumps of big pitcher plants; while wild pink Cosmos, wild Coreopsis, and an infinity of other spring blossoms enchanted the observer. There was usually a certain amount of Spanish moss on the trees, but they were rarely overwhelmed and overladen with this burden, as are so often the giant live oaks and indeed most of the other species of oaks in the northern and central parts of the state. In many regions there were scattered clusters of "cabbage trees," as the crackers call big palmettos — because the growing bud, when chopped out of the summit of the tree, makes a delicate salad or a good substitute for cabbage when boiled with a bit of white bacon.

I have been asked on numberless occasions about the difference between a palmetto and a palm. The answer, of course, is that there is none; but palms of the genus Sabal and Serenoa happen to be called "palmettos" throughout all the southeastern states. Of the former genus there are a very considerable number of species, most of them tall and stately trees. Of the other group there are two types with their trunks procumbent, form-

ing clumps or thick mats on the forest floor. These are by no means all the palms to be found in Florida. There are a number of others in the southern part of the state and in the Keys. I might mention especially the silver palm, since it is so prominent a feature of the piney woods of extreme southern Florida. It is extraordinarily slow-growing and impossible to transplant – but a beautiful sight with the sun shining on its foliage. The leaves look as if they were manufactured from some white metal and were not made of vegetable matter at all.

Sargent's palm, a singularly graceful plant, once abundant on some of the Keys, has now completely disappeared. Its curious and picturesque bulbous trunk made many people covetous, and innumerable specimens were dug up and moved into patios and dooryards, where they usually lingered for a few years and then died. Fortunately the same, or a very closely related, species persists on some of the more inaccessible islands of the Bahamas; but I should not know where to go to find a Sargent's palm in Florida today.

My readers will be disappointed in the extreme as they travel by train or by motor through the piney flatwoods region today; generally speaking, the area affords sad and dreary vistas, and only here and there are there undisturbed patches that enable one to see in one's mind's eye what once were among the loveliest regions of the whole wide world, through which one traveled hour after hour on end.

* * *

It must not be thought, from what I have written, that there are no portions whatever of Florida which do not look as they have always looked. The spruce pine ridges, growing as they do on sand, are entirely infertile, and are unchanged – except where they have caught fire. All those great areas in Northern Central and Northwest Florida, generally called "scrubs," are dreary in winter, since the rather uninspiring species of oak hold their dead leaves and remind one of Cape Cod rather than of the Deep South. But with the coming of spring their rolling lands are bedecked with fresh green, and are very lovely when the young dogfennel comes into bloom. The post oaks and blackjack oaks are now being cut for railroad ties, and the scrub is being more and more torn to pieces by the moss gatherers (whose activities I shall describe elsewhere).

There are still plenty of cypress trees to be seen from the Tamiami Trail, pale gray ghosts in winter, but fascinating green forms in spring. The draining of "the Glades" has brought about the destruction of many, by fire, and at best this was never a region of stands of those giant cypress trees that once existed in other parts of the state. Now the only evidence of the giant cypress is in the form of great dugout canoes tied up at Indian camps along the Trail. No more of these boats will ever be made; most of them are very old. But they show what the cypress trees once were. The great Jane Green Cypress Swamp, which I remember as a boy, was southwest of Melbourne across the St. Johns River. Only a

Courtesy of Worth Monroe

The cypress on New River, site of Fort Lauderdale, taken in 1884

few trees remain, rotten at the heart and not worth cutting. Even the trestles built to carry the special railroad across the river marsh to haul out the cut cypress are now but rotting stumps. A few magnificent trees are being preserved just by the roadside, not far from the city of Kissimmee; and up near Eureka, a tiny town just northwest of the Ocala National Forest, which is a scrub area, there is one single cypress, well-cared-for and carefully preserved (it may be reached by a narrow wooden path through the swamp). That great cypress tree is surely one of the largest trees standing anywhere on the American continent outside of California.[1]

The stranger coming to the Miami area will be mystified by what everyone calls "the Australian pine." He will think that it does look a good deal like a pine, but I can tell him, right here and now, it is no such thing: the beefwood (*Casuarina equisetifolia*) was brought to Florida from Australia as a quick-growing tree to use for windbreaks around orange groves. Its finely divided branchlets, which look like pine needles, give it its common name; but now the tree has been widely distributed as a roadside shade tree and, moreover, the curious little fruits have been spread around by birds, so that Australian pines are springing up here and

[1] My friend Ross Allen Esq., of Ocala, writes me that this tree is 120 feet high, 80 feet to the first branch, 40 feet in circumference at the base. It contains 10,000 board feet of lumber and is estimated by the timber experts of the Wilson Cypress Company of Palatka to be 2500 years old.

there all over the Everglades. I suspect that if we could look forward a hundred years we might see a forest of beefwood trees covering a large part of the Everglade area – even the strongly saline regions of the very southern tip of the state, where almost no other introduced plants will take root. Beefwood burns in the fireplace to a lovely white ash, and is used sporadically to make handles for chisels and screwdrivers, but even with these attributes, it is a poor substitute for the cypress which is gone.

It is greatly to be hoped that, in the future, Florida can carry on some much more extensive projects for reforestation. The Forestry School at Gainesville has done well and many small demonstration forests have been set out in various parts of the state, but much larger projects are needed. Perhaps someday some of the money derived from the gasoline tax will be routed in this direction, as well as to foster higher education. Hitherto, this has been earmarked for road building; but the state has superb roads now, and they don't suffer from the frost damage which necessitates such extensive annual repairs in New England.

At this moment the sun is obscured. I look out over Bay Biscayne and the scene reminds me of the New England coast in summer. It is what we should call a "dungeon of fog." Glades are on fire and the smoke, combined with the moisture-laden atmosphere, makes

bad breathing weather. Of course this will not last when the wind changes from the west – where it should not be at this time of year – to the normal southeasterly direction; but it is a reminder, and a very unpleasant one, of what is going on. This year of 1943–1944 has been unusually rainy, the vegetation is fresh and green; nevertheless it has been long enough since the last rainfall for the Glades to have dried out in spots and they have caught fire again – a reminder of the devastation I have been writing about. But even the fires cannot last forever. When all the muck lands to the west of us have burned off, down to bare sand, marl or rock, the atmosphere will clear; but when this does come to pass, it will mean the presence of a wide desert.

CHAPTER VII

Camping

FOR several years after the First World War my wife and I rented houses and made long stays at Palm Beach, then a much less sophisticated resort than it is today. I had a Model T Ford station wagon that had been rebuilt for camping purposes. On one side of the car, where one would normally step in and out, there was a wonderful wooden contraption of little cupboards, each with its door. These contained staple groceries and such items as onions, sweet potatoes, and other vegetables which were not particularly perishable. There were slings for our guns under the top of the car; and in the place where the back seat would have been, we had stowed a tent, camp cots, folding chairs, and a folding table in such a way as still to leave room for a dog.

I drove, with our friendly guide, Frank Carlisle, beside me. In the second seat, often, was my wife, accompanied perhaps by one of her sisters, her father, or her mother, who were frequent visitors. Our usual procedure was to drive north up the Dixie Highway, then a narrow black road where at times it was difficult for two cars to pass, but now the great boulevard, route U. S. 1, with its dreary vista of billboards and hot-dog stands.

At Jupiter we usually stopped for a visit to Bowers's

store. This was a typical country store where one could buy anything from iodine to sweet potatoes. We liked to trade there because the people were so kindly and it was such fun to sit and spin yarns for a while, occasionally reaching out for the prune box or the cracker barrel. Then we would turn inland on the narrow sandy road to Indian Town. When the water in the woods was not too high, there were many places where one could drive far off the road to the north or south, penetrating what was known as "Hungryland" or the Loxahatchee Marsh. Here quail abounded, there were still lots of turkeys and plenty of deer, and one seldom met a soul.

There was a ditch beside the road where big bass congregated during dry weather, no doubt because the water stayed cool in the deep holes. It was only a matter of minutes, after Frank and I got back from our morning hunt to where Rosamond would be sitting in the shade in our folding Livingston chair, probably knitting, before we kicked off our shoes and got out our little seine. We each took an end, and kept the seine taut by putting the toes of one foot through the mesh at the bottom, and holding up the upper corner. Then, by scuffing along, we worked the seine around one of these big holes.

In less than no time we'd have half a dozen two- or three-pound bass flopping about on the sand of the roadside. I believe Ros would agree with me – though she holds no brief for camping in general – that those bass, fried immediately, were succulent beyond exaggeration,

and the particular type of sweet potatoes which we chose, when sliced and fried, could be eaten out of hand just like a hard cracker. They not only were savory but they stayed by one very satisfactorily.

One day, while we were at lunch, we looked out through the woods and saw two little gray foxes walking along across a wide stretch of short grass. I wanted those foxes for the Agassiz Museum and Frank knew just how to get them. We jumped for our guns and Frank started to run towards them, letting out bloodcurdling whoops. One fox did what he expected both would do: squatted down flat in the short grass. This one was easily gathered in. The other one ran into a little bay head about an acre in area in the midst of a shallow needle-grass pond. I ran around, plowing through the water, and got to the other side of the head. Frank went in where the fox had entered and started to light up some dead limbs and a few dry palmetto fans which happened to be right where they were wanted. In a jiffy the fox came out on the run in easy range for my old beloved Bradell twelve-gauge, and we had our two specimens.

We often met up with Dan Parker, a handsome young Indian, and his pretty bride, one of the Tiger Tail girls, she being loaded down with yard upon yard of brightly colored beads about her neck to show the magnitude of her aristocratic inheritance. Occasionally they lunched with us. We frequently tried to camp near where Billy Stewart – another Indian – had his clan hunting. Then, if any trifling cracker came round with theft on his

The model T, with campfire burning and the author at his ease in Hungryland

Photo by John Phillips

The upper reaches of the Loxahatchee River where John Phillips and the author used to go canoeing

mind, some Indian would be sure to see him and tell us about it. The Indians never entertained such ideas themselves.

You may wonder why I use the word "cracker." I myself wondered for many years about this term for what may be called the poor white natives of Georgia and Florida. Reading Bartram once supplied the answer. He said, as I remember it, "I journeyed now into the land of the corn crackers." As the world knows, the crackers' staple food is hominy grits and gravy; and grits, of course, are made from cracked Indian corn.

One winter while John Phillips and I were enjoying the hospitality of Charlie and Louise Choate at Palm Beach, there was a good deal of water in the flatwoods and we decided to make a rather ambitious hunting excursion. I suspect we were lazier than usual by pure "happenchance," to use an old localism. We picked out three good-looking, husky and, as it turned out, very skittish horses, and arranged to have their owner deliver them to us at an appointed rendezvous a good many miles west of West Palm Beach.

We set forth at the crack of dawn, reached the appointed spot soon after day broke, and found the horses waiting for us. They had been on the move all night. I mounted one horse, Frank another, and a colored boy whom we had decided to bring along to look after our steeds mounted the third. John Phillips drove the car; he never liked horses anyway.

We moved along about five miles, and all the time it became more and more obvious that my nag was utterly unreliable. I was riding across a prairie pond when he suddenly got wind of a good big water moccasin. One prodigious buck burst the girths and left me, and the saddle, in the pond – as a matter of fact, pretty close to the moccasin. The horse started straight for home. I shook myself off and got into the car with John. Through the open woods we could see our horse going like a bat out of hell. We felt that this was good riddance.

Several miles farther along, Frank's horse apparently simply decided that he wanted to go home too. He bucked Frank off, which required no great effort, and then we had one horse left. One horse had no well-defined use; so, after a day or two of debating the matter, we sent this beast home too and settled down to a singularly pleasant and peaceful sojourn.

We found an area of flatwoods which was high enough to be well drained, an excellent camp site. There was fat pinewood near at hand to cook with. Quail were plenty, the coveys big and the country of such a character that after we shot on the covey rise and the birds scattered, there were no thickets or swamps for them to escape into, and the singletons were easy to pick up one by one.

I had taken a double boiler from town, because grits are easily burned on a fat pine fire, and personally I hold that they are infinitely superior when they have been cooked a long time. We peeled our quail and poked them down into the grits. They cooked through and

were deliciously moist. They would have been just as succulent cooked in our Dutch oven, but that was usually occupied by a pone of hoecake bread.

We ate lots of things besides quail and grits. I had stopped at Eau Gallie before John Phillips came south to meet me, and I picked up some gopher turtles. There were always a number of these around Grandmother's grove. These tortoises dig enormously deep burrows in the sand. They are easily caught if you find one abroad, but when they will emerge to graze seems wholly unpredictable. I used to take a box, dig a hole in the sand, right in front of the burrow, sink it down, and cover it with a sheet of thin newspaper, sprinkling a little sand on the surface. I never had to wait more than a day or two before Mr. Gopher came along, broke through the paper, and landed in the box.

Grandmother taught me forty years ago that gopher turtle stew is just as good as diamond-backed terrapin. Moreover, if you don't have sherry or Madeira to flavor it with, a half cup of whiskey is a most excellent substitute, although the idea would, I think, have shocked Grandmother. Nevertheless it was taught me by a great and good epicure who moved to Eau Gallie some years after Grandmother's death. This was Dr. Samuel J. Mixter, the world-famed surgeon of Boston, who occupied Grandmother's Walden on a number of occasions before he built his own house only a few hundred yards away.

I will not say that we never ate a robin, for we did, and a good many doves. These are both better birds to eat

than quail. Moreover it was often possible to pick up a few gallinules and the native Florida dusky ducks. These are all superior victuals, and when washed down with Frank's coffee . . . My mouth waters even at this late date.

One day we followed a single quail into a bay head of tall, scrawny cypress and made a discovery. The trees were probably sixty or seventy feet high. In the very center of this head, which we had to wade into, there was a deep, dark pool of black water about fifty feet across. It was obviously an old gator hole. I suspect the place probably owed its depth and excavation to the fact that it had been stirred up and dug about by big gators since time immemorial. John and I often went to this pool, after our discovery, to rest in the shade. There was a fallen cypress tree which provided a delightful place to sit.

We knew that it was a roosting place for some sort of bird, but in daytime it was completely deserted. One day we moved camp and left Frank to prepare supper while we waded in and sat down beside the pool, late in the afternoon. We had been there less than half an hour when white ibis began to pour in. They came in flocks of from ten to fifty, circled around once or twice, and then settled down in the trees. I have never forgotten the snowy white birds with their sharply defined black wing-tips silhouetted against the azure sky and, far more spectacular, their reflections in the black water of the pool.

The next day John brought his big Graflex camera,

but the scenes were impossible to photograph. We saw no gators and we caught no fish in the pool, though we tried to do so. There was just the one attraction – the arrival of the ibis. They treated us every day we remained there to one of the most attractive spectacles that I ever have had the good fortune to enjoy. And any spectacle of this sort is made doubly memorable when it is observed in the company of one who is at least as thrilled as you are yourself.

A man in West Palm Beach had a scow with a house built over part of it. This I hired from time to time for trips to Lake Okeechobee. It was not luxurious, but the roof was tight and there our canoe rested. Inside there was plenty of room for our Gold Medal cots. Dr. Leonard C. Sanford and Lord William Percy, both ornithologists and our house guests, made several trips in this craft. Frank Carlisle was guide and very much also philosopher and friend. We used to go out the West Palm Beach drainage canal to Canal Point and so to Pelican Bay on Lake Okeechobee, then as wild and untouched as any spot in Amazonas. Having anchored our "houseboat," after a leisurely but not picturesque journey of six or seven hours between the high ditch banks, we lazed away the days hunting, fishing, and observing nature generally.

Set lines, put out in the evening, provided an abundance of delicious catfish, ducks were plentiful, hearts of palms were easy to get, and from these Frank produced a good mess of cabbage, cooking them with side meat,

which is white salted (not smoked) bacon. I remember to this day the taste of a young hen turkey cooked to a turn in our old iron Dutch oven that stood in the open fire in a big box of sand on three short legs and had a tight lid on which coals and embers were heaped. Thus none of the juicy vapors emanating from the bird during the process of roasting escaped. We certainly lived well.

One evening I heard a chorus of frogs that made the very welkin ring, though apparently only one species was calling, without doubt *Rana sphenocephala*. Frank and I shoved out in the canoe with a powerful headlight to see the show. To our surprise not a single frog was to be seen in any direction. I am sure these frogs were resting on the sandy bottom of the lake, which was very shallow where the chorus took place. Passing air from their lungs to their great blown-up throat pouches, back and forth, they thus produced the chorus under water, while respiration was taken care of by their wet skin.

One day Frank and I went out to garner a mess of coots which, though Marjorie Kinnan Rawlings apparently doesn't agree, Rosamond and I consider one of the most delicious birds of North America for table purposes. Their singular combination of the flavor of shore birds with that of the best of the ducks makes them a real delicacy.

We were shooting coots when all of a sudden one of us did something – we are both pretty big and clumsy – which capsized our canoe. I could just barely touch

bottom, and I was over six feet five in those days. Frank was shorter and could not swim. He kept his head, however, and clung to the canoe, which I righted and steadied while he climbed back aboard. Bailing with his shoes, he managed to empty most of the water and then, moving to the middle of the boat, he continued the process of emptying while I ducked down, groped about, and finally recovered our guns. Frank then returned to the stern and paddled slowly, while I clung to the bow, holding on to both sides. Our paddles luckily had not floated away. He had to push only a short distance when the water shoaled; I then had no difficulty in getting aboard.

For hunting in the woods during the dry season, which coincides in part with the open season for game, a tent is hardly necessary, and it is very pleasant to scoop out the sand and sleep beside the fire. It will be just cool enough toward dawn to make a light blanket comfortable. This is the time of year when the owls are in a romantic frame of mind, and one does not have to be an accomplished owl mocker to bring one to a pine tree right up in the firelight, where it will sit, bowing up and down and peering about, avid to meet the sought-for mate.

I know some people who dislike what they call the "yelling" of the birds in spring, and I must confess that on moonshiny nights the mockers do sing pretty loudly, but I consider it well worth staying awake to hear them. I think, however, that the greatest fun of all is to wake

up half an hour or so before daylight anywhere in the South in springtime and to hear the birds as one by one they wake up themselves and begin to sing.

I remember one particular night in India when Ros and I sat up all night on a little spidery platform in a tree, hoping a tiger would come to eat the goat which we had staked out for him. He never came, but in the morning the birds, from peacock and jungle fowl to the rollers and the bulbuls, were compensation enough for the cramped and uncomfortable night we had put in. Perhaps the most interesting amusement of all was contributed by the awakening monkeys with their ceaseless bickering. Certainly all our wild-life neighbors woke up in rare good form on that particular morning. . . .

But to return to Florida . . . Rattlesnakes are not sufficiently abundant to be bothersome by snuggling up against one for warmth, as they do in certain localities in the Southwest. Frank and I never thought of snakes or paid any attention to them when we were hunting; in fact, I often traveled in canvas sneakers, without socks, because these were cool and dried out quickly. I think perhaps this was foolish, and I should not do it if I were hunting again today, though wet leather boots are mean footgear to tramp in.

The best quail dog I ever had was a cross between a setter and a spaniel. Finally, hunting one day, he was bitten by a snake, and although he recovered, he was never any good thereafter. Why this should be I know not, but I have heard of many other persons who have

had the same experience with dogs which have been snake-bitten. I suspect the reason he did not die was either that the snake was a small one or had recently emptied its poison glands. If an animal is bitten by a snake only a short time after the snake has killed prey for its own consumption, the amount of venom resecreted may be relatively small in quantity and do little harm.

John Phillips disliked snakes particularly, and I never could persuade him that one did not need to pay much heed to cottonmouth moccasins when they were swimming about. A snake afloat can catch a fish swimming right next to him, but a strike at a wader's leg is quite a different matter. The water provides no substance which will back up the strike. But coiled up on a little tussock or on a floating log the reptile at once becomes dangerous, and here I naturally give one just as wide a berth as John or anyone else. A snake usually takes notice when one is some little distance away. You can tell that he is alert by the way he tips up his chin. If you get too near him he will stretch open his great white mouth – hence the name "cottonmouth," by which moccasin snakes are uniformly called throughout most of the country where they occur.

I always had a good time in camp with John Phillips. John's plaintive musings over the discomfort of redbugs, the scarcity of quail, the probability of a thundershower, the heat, and a thousand other little matters, many of them dietetic, were a constant delight. He was so delightfully whimsical and amusing, and indeed philo-

sophical, as he uttered his observations, that one was ever waiting for his next word. I wish we might have had more trips together.

We had some grand canoe rides down the Loxahatchee River, beginning way at the upper end where the trees arch completely over the stream of black, deep, still water. There was an enormous gator which we saw regularly when we paddled our canoe to what we called our upper landing. Farther downstream the banks open up, the river grows wider, the ospreys wheel and call as the canoe passes near to the trees where their nests are built.

Often, holding onto the bushes on the bank down where the stream begins to be quite brackish, we stopped to watch the manatees, the most satisfactorily prehistoric-looking of all the wild creatures of our country. A big specimen is eight or nine feet long, with gray hide like an elephant and a gigantic round, flat tail, with which it can drive itself forward with astounding speed. It has queer little crooked under-front flippers which play little part in locomotion but a great part in gathering grass together on the bottom, to be consumed by the strangest mouth in any animal I know. The mouth opens, to be sure, as any other mammal's does, but the upper lip, cleft far deeper than a rabbit's, opens out in a most peculiar way, which aids in tearing the grass loose and helping to work it into a rather small mouth cavity for such a gigantic animal.

Manatees now are closely protected, but they are so

delicious to eat that most crackers find it hard to refrain from taking one into camp when the opportunity offers. Not long ago a friend of mine had a conversation with an officer of one of the blimps on the coastal patrol. The officer reported that from high in the air he had seen some thirty manatees in a day while flying over the shallow waters of Bay Biscayne, right near Miami.

Frank and I, when we were out alone and when we were well off by ourselves, frequently never bothered to put up our tent, taking a chance that the weather would stay fine. In early spring there are not many mosquitoes. But if we were going to be in one spot for several days, we always had a tent standing near by, whether we used it or not. For camping in warm climates the open-front tent is far more serviceable and comfortable than an A tent. The big front flap can be tied up to trees or poles to make a shady porch, or dropped to make a mosquito screen, which is highly desirable.

In localities where malaria is prevalent, I always cut heavy poles and lay them along on pieces of heavy canvas stitched to the sides of the tent and the bottom of the drop bobinet front. This arrangement prevents the entrance of mosquitoes on all sides. The best material for the tent is balloon silk treated with paraffine. This makes a light tent, one which can be rolled up into a relatively small compass and which is really 100 per cent rainproof. These matters may not, at first sight, seem to be important, but be it remembered that there are parts of

Florida where malaria not only is prevalent but may be very severe.

A light floorcloth for one's tent is also extremely useful. This, with four wooden poles laid on the three wide cuffs turned in, as it were, from the side walls and back of the tent and along the bottom of the mosquito-screen drop front, makes a really safe capsule in which to sleep. I have often used a piece of balloon silk, in the form of a square about sixteen by sixteen feet, with unbleached muslin sewn to it so that it hangs down two or three feet, and then have sewn on a four- or five-foot wide strip of bobinet. More unbleached muslin below this strip makes a screened-in dining room or writing room easily erected simply by hanging the contraption between conveniently placed trees.

Mosquitoes that buzz and hum in Florida do not carry malaria. The Anopheles stand on their heads while they bite silently, so that you can recognize them if you happen to see them. Their sting has a peculiarly fiery quality, as if you were touched with a white-hot needle — a glorified sand-fly bite. Happily even in the most dangerous region not every Anopheles mosquito is a carrier of malaria. But where there is malaria and Anopheles are relatively few in number, the probability that they may be infected is distinctly increased.

Anopheles begin to fly at dusk, so whenever I was in the country where malaria is prevalent, at the times of year when sportsmen camp out, I habitually ate a very early supper and then got behind my mosquito netting.

At daybreak we always waited until we observed that the Anopheles resting on the bobinet had all flown away, and then we emerged.

For this overcautious regime, planned to protect an old hypochondriac, I have frequently been laughed at. Once it was at Garachiné, in Eastern Panama, by a Mr. Bibbins, a lumber cruiser who intended to take a jaunt into Darien to see what trees he could find capable of being worked up into valuable cabinet woods. I left him in this little town but went back there, several weeks later, to replenish our supply of rice. I asked Juan Lee, the Chinese who had a tiny store and who acted as our banker, about Bibbins. He walked me out a short distance to the little Campo Santo and pointed to a grave. It was decorated by a broken chamberpot, in which a bunch of magnificent Cattleya orchids had faded. Poor Bibbins had scoffed for the last time at taking precautions against Anopheles.

CHAPTER VIII

Beaches and Sponges

BEACHES as extensive and with as firm hard sand as the Florida beaches exist in places along the coast lines of Virginia and the Carolinas, roughly from Cape Henry to Cape Hatteras. More often up there, in my experience, after encountering fine driving conditions for perhaps twenty or thirty miles, I have found stretches where the sand is coarse and mixed with gravel, so that it does not form a firm surface, and in such places one may easily come to grief driving a car. Sand beaches are not continuous along the East Coast of the United States by any means, but there are many sandy stretches scattered between North Carolina and the mouth of the St. Johns River. Below this, however, there is a sand beach along the whole East Coast of Florida, sometimes steep and narrow, at other times wide, hard, and firm. Everyone remembers the automobile races during the days when the evolution and development of motorcar designing were in active process, when races and various tests of speed and endurance were held regularly along the region north and south of Daytona.

First and most vivid of my early impressions of Florida is a fishing trip to the ocean beach directly east

of Grandmother's house. I took her heavy, able skiff, for the Indian River is several miles wide and may become quite choppy with a strong wind. I rowed, as I have told earlier, across to the southern tip of Merritt's Island, across the Banana River, which joins the Indian River just at this point.

Once I was safely across, I took a narrow winding trail which led through the thick palmetto scrub a mile and a half or more to the ocean beach. I often trudged along this path, feeling very much of an adventurer. When I reached the beach, it was frequently evident that Br'er Bear had been on hand, looking the situation over to see whether any sea turtles had come ashore as yet with egg-laying in mind. (They are due on the full moon of May or thereabouts. With bears, coons, skunks, and men, too, hunting so diligently for the clutches of eggs buried in the sand, I wonder how any ever escape to hatch and replenish their kind.)

I often sat down on the beach just to watch the pelicans flying by, the porpoises rolling lazily just beyond the surf, and the little ghost crabs playing about in the dry white sand. The beaches of Florida provide thousands of persons with pleasant recreation as they fish – either from shore, usually for croakers and whiting, or, late in the season, for pompano; or from the long fishing piers, for bigger quarry which are now scattered along the coast.

At Palm Beach we used to sit on the sand in front of our cottage on days when the sea was calm and watch the

Bahamian Negroes running their seines. They worked in pairs, one man managing the engine and the other standing with his bare feet on the gunwales of their boat, right up near the bow, holding a rope made fast through the nose of the stem to steady himself.

The ability of these men to spot a school of fish was uncanny. They had to do this while still some distance from the fish—so they would not be frightened off and so that there would be time to stop the boat, get one end of the seine ashore, and then run out around the fish, dragging the net and finally bringing it to the beach ahead of where the school of fish was swimming. The seine was then drawn ashore. How often we helped, and how delicious were the pompano which, twenty-five years ago, were well within the limits of one's purse! In the winter of 1943 they brought $1.05 a pound in Florida. If you can spare the cash, however, they're certainly well worth it.

Anyone who has followed me thus far in my remarks concerning beaches will be surprised that I have made no mention of Florida's most famous product: the bathing beauties. If, however, you have had the misfortune to see what I have seen on numberless occasions, where those who should have been most scrupulously careful to veil themselves were most unkindly revealed, I feel certain that you would be disinclined, with me, ever to go near a popular bathing beach again. But those lovely bits of femininity which you see depicted on picture postcards and broadcast in the "literature" pre-

pared by the Chambers of Commerce are altogether too rare to make beachcombing worth while.

In speaking of the beaches, I tend unconsciously to choose examples along the East Coast of Florida (I have spoken of the beach at Daytona and alluded to the beach at Miami); but those beaches which really are the most celebrated in the whole state are on the West Coast, not far from Fort Myers. This part of Florida is the haunt, indeed the very Nirvana, of the shell collectors. There is no heavy surf here and there seems no particular reason why beachcombing for shells should be so much more productive here than elsewhere, but the fact remains that it is. The beaches of Sanibel Island and Captiva and the mainland near Bonita Springs are famed far and wide throughout the world where lovers of mollusks meet together and discuss their treasures.

I know of no other place in the world where the practice of conchology, or "malacology" as it is often called, is so deep and abiding a cult. On Sanibel Island shows are held, and gorgeous displays they are too. Prizes are awarded for the outstanding captures from year to year. The run-of-the-mine devotee combs the beaches, walking up and down after each high tide. The more seriously affected amateurs and the scientific students, museum curators and such, who visit this region very frequently, go offshore and use a dredge. Many of the objects which they find are of wondrous beauty and it is not difficult to see how absorbing this pastime may easily become. I have been told on excellent authority

that there is no region in the whole world where so many species of shells have been found within a limited area as on this little stretch of the southwestern coast of Florida. Some 450 species have been recorded from the shores of Sanibel Island. The only locality which is said to be more productive is the Malabar Coast of India.

The beauties and wonders of the coral reefs have been described time and again by abler pens than mine. The great fringing reef of Florida, extending along outside the Keys and up to Cape Florida at the southern point of Key Biscayne, was first systematically explored by my predecessor Professor Louis Agassiz. Many other more recent writers have written fascinating accounts of coral-reef beauty, usually deriving their information from the Bahama Islands or the Bermudas, since in both those localities the reefs are somewhat more accessible, grow in shallower water, and are usually more easily observed than they are about Florida.

The fact that typical reef-inhabiting fishes have been found as far north as Charleston, South Carolina, shows that there are reefs scattered for a long distance along the southeastern coast of the United States, although they are too deep in water to be visible. I shall not attempt to describe what may be seen. But I do want to point out that an opportunity exists right at Miami for an aquarium which I believe would be self-supporting; perhaps this might help support a marine biological laboratory, which would be more accessible, would draw upon a more

widely varied fauna, and would be more economical to maintain than a laboratory anywhere else where similar conditions occur. I am going to expand on this thesis later on.

In common with countless others, I have often enjoyed visits to the Sea Gardens in Nassau, in glass-bottomed boats. I have never seen the reefs of Florida under quite similar conditions. Coral reefs, however, whether you see them off the coast of New Guinea or off the coast of Florida, are essentially similar in appearance. To be sure every individual species in sight may be a different one in each locality, but the mass effect will be the same.

The chains of what appear to be miniature castellated mountains will be there. These little mountains are surmounted by forests of stiff, branching structures, which are stony corals. Indeed the mountains themselves will be built of coral, too, with excrescences which are sponges, tunicates and masses of Corallinaceae – stony, encrusting marine algae, often of bright and varied colors. Then, waving and swaying back and forth in the currents of the sea, the long, flexible colonies of horny corals or alcyonarians – called "sea whips" and "sea fans" – appear at first sight to the nonprofessional observer to be plants, not the animals that they really are. The reefs themselves are brightly colored; the anemones, the Crustacea, and the mollusks associated with coral reefs are brilliant and beautiful too; but the prime decoration is added by the fish.

Many of the reef fish – butterfly fish, angelfish, surgeon fish, triggers, parrot fish, and the innumerable members of the wrasse or labroid family – are extremely gaudy. Many others are less noticeable only because they are usually motionless; they would be inconspicuous indeed were they not vividly colored. I could describe hundreds of examples. All I want, however, is to say enough to make my reader eager to see a reef for himself.

I wish I were young again and might take a course in marine zoology, such a one as is given at the University of Miami. Each member of the class, with a diver's helmet, has an opportunity to see the reef in an intimate way, and I venture to say that no student ever forgets the experience. What would be more enchanting than to rest quietly on the bottom, on one of those little patches of pure white sand which we see so often in all reefs, where the coral mountains with their caves and bizarre backgrounds rise high about us and the singularly fearless reef fish give us an intimate chance to admire them at close range? But be careful, as you walk about, not to step on any of the great spiny sea urchins which abound. To be sure they are conspicuous and easy to avoid. If, however, the spines get into your feet you will have extreme difficulty in pulling them out, and they make a very uncomfortable wound.

The great brain corals, which are the massive reef builders, provide shelter for innumerable tube worms – and these, when extending, make a gay garden of animated flowers. Many starfish will be found right out on

the sand, but the myriad brittle stars will be less conspicuous and may only be found by prying up some of the smaller chunks of stony corals and looking beneath them.

There have been marine biological laboratories at Bermuda and the Tortugas. The reef conditions of the Tortugas are excellent, but transportation difficulties make it expensive to take investigators out from Key West to the islands and back, to say nothing of feeding them and providing for their scientific requirements while they are there. Therefore this laboratory has sensibly been abandoned. The laboratory at Bermuda is, of course, closed on account of the war. The Bermuda Aquarium is open and, I suspect, self-supporting. Once there was an excellent aquarium at Miami, but the real estate boom from which Florida suffered some years ago had manifold evil effects, one of which was that the land where the aquarium stood became so valuable that it too was abandoned.

It is time now for this aquarium to be re-established. Here is the only place in North America (except the West, which is too remote) where a great aquarium comparable to the one at Honolulu or Monaco might be maintained. The number of visitors who visit Miami every year is sufficient to guarantee its support if a reasonable entrance fee is charged. This is, I believe and hope, almost certain to be done when the war is over. The unique opportunity for the University of Miami to expand the little building which it now occupies as a

marine laboratory near the entrance to Miami Harbor will provide a much more convenient opportunity for investigators to work out problems involving the use of tropical animals than anywhere else. There seems no justifiable reason to open laboratories for the benefit of North American investigators in foreign countries that are difficult and expensive to reach. I confess that it was a long time before I realized the potentialities of the Miami area in this direction; but now I am going to do everything in my feeble power to push the utilization of these opportunities, rather than to support an institution outside the confines of the United States, no matter how attractive it may be from other points of view.

The Gulf Stream is readily accessible from Miami, almost as accessible as from the Tortugas. The reefs are widespread and with a rich fauna, more extensive and with a much more abundant representation of species of all groups that may be found about the coral reefs of Bermuda. In many respects, the Bermuda reefs have a fauna which is relatively depauperate. At Miami, moreover, the mangrove swamp association of plants and animals is easily accessible, as are muddy shores and sandy beaches.

Miami should become the marine biological capital of America for tropical fauna, just as Woods Hole is for the temperate.

Ever since the dawn of civilization, man has been seeking sponges in the Mediterranean basin. It is a far

cry from that time when a Greek jumped overboard with a weight to carry him quickly to the bottom. He would gather up such sponges as he could reach in a few minutes and then rise to the surface. The Greek sponging fleet of today, as one sees it at Tarpon Springs, with its gaily painted, sturdily built little vessels bearing the great names of classical Greek history, is the last phase of an ancient trade. You may see an old-fashioned rig of sails, but with it goes the most modern diving apparatus which can be bought. These men have to work in dangerously deep water, as the shoal-water sponges are now rare because of the close harvesting which has come with the new efficiency.

There are two groups of spongers in Florida. The Greeks, whose home port is Tarpon Springs, fish pretty much anywhere they wish north of the Ten Thousand Islands bay region; while in the Keys the fishing is carried on by the "conchs," as the natives of the region, usually of Bahamian ancestry, are called. They use the same inshore method which is practised in the Bahama Islands and along the South Coast of Cuba. Between the conch fishers and the Greeks there is a deal of ill feeling: the conchs resent the Greeks' encroaching on their territory about the Florida Keys. Now that the Greeks have found that they can sponge profitably in deeper water than that of the conchs, the rivalry may subside. At one time it threatened to be serious.

The sponge fishers in the Keys necessarily limit their activities to where they can see bottom. With the

use of a water glass, which is a box or bucket from which the bottom has been knocked out and a heavy light of glass substituted, and which they push down slightly below the surface of the water, they have a window enabling them to peer to quite extraordinary depths of the clear water to be found in the Keys during calm weather. (During windy weather, when the water is roiled, they tie up to one of the Keys and fish and smoke and generally take life easy.) Their ability to see down to the bottom in deep water is uncanny, their eyesight is extraordinary, and they hook up the sponges with an enormous long hooked pole that they use very cleverly indeed. I have often been fishing far at sea with conchs or Negro fishermen from the Bahamas who could tell exactly what sort of bottom we were trolling over even when the water was pretty well rippled by a light wind, and who could discern and identify individual objects on the bottom which to me were invisible or nothing but a blur.

Sponges when they come to the surface are disgusting black objects. They are left on deck until the animal matter coating the horny skeleton, which is the sponge of commerce, dies; and, I may add, stinks with a vile, revolting, and utterly nauseating stench. Then, in the Keys, the sponges are thrown into a "crawl," a little area of shoal water fenced about with upright poles. Here the current washes away the "spong-gurry." After this the sponges are strung on strings, hung up in the rigging to dry, later to be brought ashore. Skilled women then clip

and beat them to get out sand and remains of the little mollusks and crustacea which live in the cavities of the sponges, and they are finally ready for the auction, which is an exciting event, be it in Nassau, Key West, or Tarpon Springs.

There are four types of sponges which are fished for commercially. The two best high-grade and highly priced forms belong to the genus Hippospongia. The coarse, relatively hard, and more cheaply priced types represent forms belonging to the same genus as that to which commercial sponges of the Mediterranean region belong, Spongia, itself a genus of widespread distribution and many different forms. They vary widely in quality and price. Some, indeed most of those procured, are the great big rough sponges which were used long ago in stables to clean down horses and carriages. Others are the bath sponges, still in considerable though diminishing use. The delicate and often very expensive wool and velvet sponges are those which once were used in hospitals — but which, I believe, are now almost entirely employed in washing babies.

A few years ago a disease among the sponges appeared which made it look as if they might disappear, but I am told that latterly this is no longer a menace and that the spongers — who, in the Bahamas and Key West at least, were reduced to a pitifully destitute condition — are now beginning to fish again.

The Greeks do the major part of their fishing offshore. Their boats are much larger, they can stay at sea for a

much longer period of time, and most of the preparing of the sponges for market is done on deck. I may add that these fishermen have also contributed considerable to the advancement of our knowledge of the waters of this part of the world, for they have learned that rare shells have as good a market value as sponges, and many rare and beautiful specimens have turned up, thanks to their shrewdness.

The Greeks are clannish and friendly but, as the world has known for quite some time, shrewdly on the alert to make a dollar. I have seen many a shell for sale on the roadside stands which never saw the waters of Florida; so that it behooves the enthusiastic shell collector to watch his step and know his species. The Greeks bring up a lot of rare and beautiful specimens, but at the same time there appears a mass of duplicate shells without locality and having no scientific worth, shells which are disposed of by some of the larger collectors and, indeed, by at least one museum I know. At times we may buy a thousand specimens for the sake of getting a handful which we really need to complete our series and the rest go — well, never mind where.

Visitors to Florida often try to get to Tarpon Springs for the Feast of the Epiphany. Then the Greek Orthodox Archbishop visits his flock and is joined by the local clergy of the Greek and the Anglican Churches. He marches in solemn procession through the town, clad in the gorgeous vestments prescribed for this feast day, and he makes a rare sight as he moves slowly to the water

front and finally blesses the ships for the coming year. At the end of the service the Archbishop proceeds to the end of the wharf, takes off his gold pectoral cross and throws it far out into the Bay. Innumerable Greeks are waiting for this moment to come, and instantly they dive overboard. The cross is always found, and the fortunate finder considers that his chances for a rich haul during the coming year are enhanced by this good fortune.

Easter is another great feast day, but not quite so publicly observed as is the Epiphany. For a number of years, with a party of friends, I used to go to Tarpon Springs on this day to eat the paschal lamb – which was smothered until tender, flavored with a lot of garlic, and always deliciously prepared at the principal Greek restaurant of the town.

Here I may add that at various times in Florida I have been served dishes recalling the hearty hospitality and excellent cooking which I have on occasion enjoyed in the Greek homeland – but have partaken of far more frequently at the Athens Olympia in Boston, a restaurant to which Professor William Morton Wheeler introduced me many years ago, and where I have essayed the exotic cuisine on many occasions.

CHAPTER IX

Springs and Lakes

I HAVE always thought that we were owed some further explanation about Ponce de León and his search for the Fountain of Youth. Who planted in his head the idea that there was such a thing? He was supposed to have made his first search in Bimini. That was a mighty poor guess from any angle. But Florida is another story, and certainly a far better bet as a hunting ground, for North Central Florida has more spectacular, indeed more incredible, springs than any other region of which I have ever heard. It is impossible here to describe these springs in detail, but it can truthfully be said that, like the stars, one differeth from another in glory.

My first choice is Wakulla, not simply because at times it is probably the largest spring in the entire world, but because there is a sense of timelessness and mystery which is overwhelming as you row about its pellucid waters. It is a unique experience to look down and see the remains of a mastodon (its mate now stands in the State Museum at Tallahassee) lying in clear sight on the bottom of the spring (although pretty well encrusted with limestone), and a bee tree obviously chopped open by the stone axes of primitive people using the tools of untold generations ago. The spring, which is really a

crystal lake in the woods, spews forth a river which winds through a lovely stand of cypress. And, since it belongs to the du Ponts, a family appreciative of beauty, it has been kept unsullied.

Here as one looks into this strange and mysterious world, one sees a bewildering variety of aquatic vegetation which sways and waves in the swift stream and through which the usual swarms of fish and turtles, snakes and alligators, wander about, pushing aside the moving plants in a strange, fairylike land under water. The water itself is so limpid that you can get no concept of depth by peering down into it and you may stick your arm down to touch a turtle and find you could not reach him with a ten-foot pole. On the shores there are birds beyond number. Here, as far as I know, is the one great concentration of limpkins remaining in Florida – that is, one which is permanent, always to be found, and not a fortuitous congregation.

Limpkins appear to some as giant rails and to others as miniature cranes. The voice is distinctly cranelike, likewise the flight, for they flap heavily with their necks stretched out straight ahead and not retracted as with herons. These birds have suffered in the past because they were noisy, not particularly shy, and delicious to eat.

Rosamond and I once visited the Wakulla spring in summer after heavy rains. In summer in this part of Florida it is hotter than the hinges of Gehenna and we had to keep our windows open to breathe. You will probably think that I am a monument of mendacity when

I say that the chorus of frogs of perhaps twenty species completely prevented sleep. It would have been as easy to sleep in a boiler mill or a drop-forge foundry. However, the early morning ride in the glass-bottomed boat over the great chasm, where crystal-clear water boiled forth from an enormous depth, was rewarding. I believe that, were not the throat from which the water pours curved on its route underground, it would have been possible to see down more than two hundred feet.

Two hundred thousand gallons a minute issue from this magic well. On the morning of our visit, the amphibian chorus died off with the rising of the sun and the only sounds were the *plop, plop, plop* of the jumping mullet and the calls of the awakening birds. Mullet constantly run up the Wakulla River from salt water, in great numbers – whether for a change of scene or for medicinal reasons I have no way of telling.

The outlet of Silver Springs is the famous and lovely Oklawaha River. Years ago stern-wheel steamers from Jacksonville used to reach the spring by way of this stream and the St. Johns River. It has been known to pour forth five hundred million gallons a day in the rainy season – enough water to supply the city of New York. It has now become a tourist resort visited by tens of thousands and unfortunately shows the result of its commercialization. Here you may be photographed sitting astride "Ferdinand" – not a bull, but a great fat ox, on the very shore of the springs; or eat a fried chicken near its bank; or watch some obviously unhappy Indians, far

from home, do beadwork and make various sorts of objects for sale.

For years I have turned aside, on journeys through the state, to visit one spring or another; so that in time I think I have seen most of them. But there are three particular beauties about which I want to say a word in the hope that my reader may someday be inclined to see them for himself. One is a fairy gem called "Juniper Springs," in the midst of the Ocala National Forest. This is a tiny spring compared to the other two, but it boils gaily out of a picturesque rocky basin from a pure white sandy bottom. The water, when the sun shines on it, becomes a vibrant and lovely aquamarine, while the spring itself is in a little clearing with well-kept lawns and a neat bathhouse for visitors.

Around this clearing the woods are undisturbed, and for some distance the trees have been identified by the government naturalists and accurately but inconspicuously labeled with their common and scientific names. There are paths wandering along the course of the bubbling stream which issues from the spring, and there is supervision which is sufficiently ominous so that no one feels inclined to dump lunch boxes, bottles, bits of paper and string — as, unfortunately, the traveling public of these United States is so often inclined to do. The setting of this spring is entirely satisfying and I salute the Forest Service for what it has done at Juniper Springs.

Farther south near Dunellon is Rainbow Spring. Here

the setting is not ideal; surroundings are somewhat artificial and the country about the spring and river which it forms is a little disappointing. But there is a mysterious quality to this water. Dr. Herman Gunter, head of the State Geological Survey in Tallahassee, told me I would never believe what he said about it until I had seen the spring with my own eyes. He told the truth: every leaf of Sagittaria, Ludwigia, or Vallisneria, or any of the other aquatic plants, seems to be limned with prismatic colors. The effect is truly eerie. The outlines of the plants are not sharp and clear as they are in the other springs, but are blurred and softened by these lovely rainbow effects in a way which is quite impossible to describe.

Homosassa is a spring for the zoologist. It is an enormous basin only a short way from salt water on the West Coast of the state. The surroundings are not particularly attractive, but it is a meeting place, a sort of piscine rendezvous, where fish of many sorts form a procession and swim around and around in the crystal water. They swim layer upon layer and cohort after cohort, dipping down out of sight in the depths and then reappearing. Great tarpon, giant jack, snook, mullet, and a dozen other species in countless hundreds parade solemnly round and round as well as up and down.

No one fishes here and the animals are fearless. This is an amazing sight indeed, one which for some reason is not so famous as it should be. I should never have seen the spot if Archie Carr had not insisted that I make an excursion there. Since then I have stopped to look at

it with great enjoyment whenever I have been within driving distance. I should everlastingly like to know what draws those fish. I suspect it may be that the exceptionally pure fresh water is distasteful to unpleasant ectoparasites from which the fish crave riddance.

From one point of view these giant springs have been a bitter disappointment. I have always expected that from time to time they would spew up samples of the life which we naturally suspect exists in some of these vast subterranean waterways. Consider these facts. In 1895 a curious pallid wraith of a salamander was shot up in the artesian well that supplied water to the Fish Commission Station at San Marco, Texas. This little creature, about four inches long – blind, translucent, its limbs modified to serve as threadlike tactile organs – was well named by the late great naturalist Leonhard Stejneger: *Typhlomolge rathbuni.*

From time to time additional specimens have appeared in this well and in others driven in the immediate neighborhood; most museums have a representation of this strange little animal, and a good many individuals have been used for experimental purposes. Now, however, a specimen seldom appears, and it may be presumed that the population was a small one. This is not the case with the European Proteus from the caves of the Alps of Carniola, in Austria, which is a much larger animal, also blind and somewhat similar in appearance. It has long been known and two different races have been described.

A few years ago Dr. Archie Carr[1] described a still more remarkable find which had been shot forth from a deep artesian well near Albany, Dougherty County, in southern Georgia. This is the most degenerate — or most highly modified, if you prefer — cavernicolous amphibian which has ever appeared. He brought it to Cambridge for study, and I suggested he call it "Haideotriton." He described it under this name, with the specific name of "wallacei," to commemorate a gentleman associated with the discovery. And then, bless his heart, he gave it to our Museum. This is a first-class treasure, and one of the most curious creatures to be found in the whole house. It never has been found again since the date of its discovery in 1939.

So it is not unreasonable to suppose that these great Florida springs should produce samples of fauna which has probably been lurking in the bowels of the earth since Cretaceous times, perhaps a hundred million years ago. There is one possible explanation for their not doing so: that because these great springs simply swarm with fish, creatures of this sort may from time to time have been snapped up when they emerged. A counter-suggestion, however, is the fact that generally fish will not eat newts and salamanders the way they will eat some species of little frogs.

These, of course, are only samples of the fabulous Florida springs. Many have been dug out for bathing

[1] Here let me acknowledge that I have borrowed freely from the Introduction to Carr's *Herpetology of Florida.*

purposes and one I am thinking of is a comfortable old-time spa, its waters cool and refreshing. The old-fashioned hotel there has its dining room in plain sight of the spring. I have always thought that would be a pleasant place to muse away a few days doing nothing. I have stopped there for lunch in driving by, but nothing more. It is called "Deleon Springs."

There are other regions in the United States where giant springs occur; and, while they are not so many or so large as those in Florida, nevertheless they are so large that I might be considered crassly ignorant did I not mention them. There are enormous springs issuing from the volcanic rock along the Snake River in Idaho. Big Springs in the Ozarks in Missouri has a recorded output of three million gallons of water a day. Mammoth Spring and Greer Springs in Arkansas are also noteworthy. These springs, instead of pushing up through the sand as they do in Florida, gush out from the limestone mountainous region which forms the Ozark Plateau, mostly in Arkansas but extending into extreme eastern Oklahoma, eastern Kansas and southern Missouri.

Florida has ponds and lakes of all sizes and varieties. Lake Okeechobee, although its area has been reduced by drainage, is still next to Lake Michigan the largest body of fresh water completely within the boundaries of the United States. It has been a costly lake inasmuch as its banks are so low – they are nowhere more than a foot or two above water level under natural conditions. Bad hurricanes have blown the lake about, causing tre-

mendous loss of life and property damage to the settlers around its shores. To help this damage, the Government at the expense of many millions has built levees and wing dams which will push the windblown water out into uninhabited regions. We have yet to see the hurricane's retaliation.

Besides this giant lake there are many other large bodies of water scattered throughout the center and northern portions of the state. The lakes with banks which are low and widely fringed with aquatic vegetation are teeming with fish, and form a favorite habitat for waterfowl of many sorts. The small, usually round, deep lakes with clear shores are singularly lifeless, and while ducks may drop in these to rest and to drink fresh water from time to time, they are not frequented by birds, and very seldom by turtles or gators to any extent. Most characteristic feature of Florida is the needle-grass pond of the open piney-woods prairie. These are the special haunt of the sand-hill crane, for it is in the middle of one of these ponds that it builds its nest where the water is perhaps a foot deep, and here it raises its young. These little bodies of water all have a hard bottom and one may wade about at will.

As a boy I spent a lot of time near Lake Washington, inland from Eau Gallie, one of the chain of lakes in the enormous St. Johns River marsh. To explain the reason for the existence of this marsh I must digress for a moment to discuss the physiography of eastern Florida.

Camp at the Loxahatchee Marsh

The houseboat in the Palm Beach Canal, 1919

The peninsula is made up of a number of north–south plications or corrugations; the easternmost of these is in the ocean, in the form of a long shoal extending in a north–south direction and separated from the beach by an area of deeper water from a couple of hundred yards to half a mile in width. Westward of this line lies the so-called "eastern peninsula," bounded by the inland waterway, short stretches of which are artificially dug, but most of which runs through the Matanzas River, the Halifax River, the Mosquito Lagoon, the Indian River, Lake Worth, Boca Raton Lake, and Bay Biscayne. The southern end of the eastern peninsula is represented by the Keys, extending down the ocean side of Bay Biscayne and continuing on in the form of a chain of keys to Key West.

In the region of Brevard County, where Grandmother moved as a winter visitor half a century ago, proceeding westward from the Indian River, one crosses a zone of high pineland varying from seven to twelve miles wide, and then west of this there is a great depression in the sand – shallow, to be sure, and filled with the St. Johns River marsh. The marsh heads up in Indian River County to the south. The river itself begins its northward journey by issuing forth from Lake Helen Blazes, inland from Micco, the channel being tortuous but usually open, although there are many floating islands or tussocks of willow, pond apple trees, and the like.

The whole enormous area floats up in times of high water and in time of drought settles to the bottom of the

great sand pan in which it lies. Lake Washington lies inland from Eau Gallie. Farther north come Lake Winder and Lake Poinsett; and so on, the river growing wider and the lakes larger until finally the chain reaches far to the northern end of the state, turns sharply eastward, and flows into the Atlantic Ocean ten or fifteen miles from the port of Jacksonville. The lower regions are navigable to steamers of considerable draft, while from Jacksonville to Sanford freight and produce are still carried on the picturesque old-fashioned stern-wheel steamers such as once ran down through the whole Indian River region before the railroad was built.

Lake Washington was the wonderland of my boyhood. I used to ride out in the dark before dawn from Walden on one of those tough little Florida horses that were universally used a generation or so ago, descendants of the horses left to run wild by the Spaniards in the St. Augustine area. Every journey I made to the lake was high adventure. The ponies were tough, sure-footed, and tireless, and I could make the round trip in a day. Lake Washington is about ten miles long and several miles wide. It does not appear to be anything like this size, because of the fringing beds of bonnets and high rushes. Through these beds one may push one's boat, flushing coots or crowbill ducks, as they are locally called, and gallinule, wood ducks, dusky ducks, and other swimming fowl. The banks are a tangled mass, principally of willows, in which, if you are very careful, you can creep around by walking on the interlaced

roots. But if you break through you go up to your armpits in mud.

When we went to the lake we headed through the piney woods for the great oak mound, said to have been an ancient Indian camping place, which was right where the pineland broke off and the open marsh stretched out to the horizon. From here there was a shallow ridge of hard sand, dry in winter but covered with shallow water after heavy rains. This led to the cabbage mound, an area perhaps half or three quarters of an acre, high enough never to be flooded, and thickly set with cabbage trees. This mound may be of Indian origin, but I am ashamed to say I have never dug there to find out. At any rate, here we kept a rowboat until, with the passing years, visitors discovered how good the fishing was in the lake. It then became worth while for someone to live on the mound, keep a few boats for hire, and later to provide an outboard motor for the use of fishermen and even to have live bait on hand. A dock has now been built, leading from the mound to open water. But I am talking about days long before such innovations.

Having reached the mound and tied up my horse, I used to push the boat out to open water, through a partially cleared area where the willows had been chopped away. Here, there was enough water to slip the boat over the slimy mud of this marginal zone even in the driest weather. On reaching the bonnet beds, I began the first stage of the day's fishing.

These bonnets are great curled-up cornucopia-like

leaves of the southern yellow-flowered cow lily. Looking over each leaf carefully, you will notice that some have a little hole right in the center where the coiled leaf joins the long stem, which reaches down to a root in water often eight feet or more deep. Reach down now as far as you can, and pull the bonnet stem loose. It will split easily if you use your fingernails; and, four or five inches below the hole which you have noticed, you will come to a fat green caterpillar. This is a "bonnet worm," and most excellent bait for the little fish that you will use to catch big bass.

A number of bonnet worms having been accumulated in the tin can which you have brought for the purpose, you now get out your bait line, black thread, a split-shot sinker, and a tiny hook. Dropping this overboard, you will not be long in catching a goodly number of small bream. These you can put into your homemade bait box, which has fairly large holes so that when it is overboard the water flows freely through the box and stays fresh for the fish. I had my own special fishing ground — I presume no better than many others. I kept its location a deep, dark secret, and I must say that it did me well. It was in the inlet to the lake — that is to say, where the St. Johns River flowed into the southern end of the lake, a region which I frequented because it was a little more accessible to the cabbage mound than was the region where the river flowed out of the lake northward.

I fished with a long stiff bamboo pole and a cork, hooking on a bream and dropping it overboard with about

three feet of line below the float. If water conditions were favorable I would soon have a mess of bass, and then, covering them over with some wet burlap so that they would not dry out, I would find a willow tussock solid enough to creep up on and make a fire and cook dinner. I remember one day when Ros, Frank Carlisle, and I went fishing that he cooked us a palm cabbage and boiled a pot of coffee on a floating island which was solid enough so that we did not break through. On our tussock, however, there seemed to be a cottonmouth moccasin everywhere we looked, with his head tipped up inquiringly in that characteristic position which moccasins assume, so that even I, who am not particularly snake shy, was relieved when we were safely in our boat once more with our victuals in us.

In boyhood, alone on the lake, I would muse lazily, paddling about during the warm afternoons, watching the birds and getting back to the mound about sunset. There was still many a giant gator in that marsh, in say about 1900, and their bellowing at early morning and at evening when hot weather came is a thrilling memory to this day. The roar of the gators, the cries of the limpkins, and the not dissimilar piercing yet melodious notes of the sand-hill cranes were indeed the most outstanding among the sounds — as the long, undulating lines of white and purple ibis were among the sights. I don't think I ever saw any of the plume birds in these early days — only flocks of little young blue herons, lovely and white to be sure, but, as Gene Kennard called them, "frauds," for they car-

ried no plume. Gene was a cracker whom Grandmother employed to take her fishing in the Indian River. He was my early mentor in woodcraft, and a good one, too, as Frank Carlisle was my companion in later years. These two loyal, warm, and affectionate friends, although little interested in game laws – or any other type of legislation for that matter – I shall remember as long as I live.

The St. Johns River marsh differs from the Everglades in only one important characteristic. That is the water, which is much more acid than that on the Glades. The saw grass is not everywhere evenly distributed, and there are many open pools of water. In the spring these are filled with white pond lilies, and the setting for these plants is attractive. When you go ashore on the western side of the marsh there are enormous areas covered with one of our fine native irises (*Iris giganticoerulea*), and here also is the southernmost outpost of the southern spotted pitcher plants with their yellow flowers, which are so conspicuous a feature of the marshes all along the Gulf Coast at least as far west as the Mississippi River.

Even today, with all of the vile deeds which have been perpetrated in Florida by man, the St. Johns River marsh is still relatively unspoiled, and I hope that it may remain so for many years to come.

CHAPTER X

Mammals

MANY of my friends dislike bats. They are afraid the creatures are going to get tangled up in their hair, and they have other silly notions. Negroes in the West Indies fear them because of their little demoniac faces, so infinitely varied and so absurd. The curious dermal structures which vary the form of bats' faces, their noses and their ears — variants which are infinite in number and which give to all the beasties a strange, puckish appearance — are to me quite fascinating. These elaborate structures are responsible for the incredibly acute sound perception which makes it possible for bats to catch their prey on the wing. It is the perception of the infinitesimally minute amount of increased air pressure, apparently, which warns the bat of its approach to an insect flying in the air. The animals keep up a ceaseless chittering entirely outside of our limits of audition, and so acute are the receptors on their facial membranes that it is possible to put bits of sticking plaster over a bat's eyes, release him in a room filled with crisscrossed wires, and have him fly about without ever touching one of them, the echoes rebounding from these faint sounds giving warning of any dangerous obstacle.

The Negroes in the British islands believe that bats

are the repositories of the souls of departed relatives and friends. Whether they be "duppy bats" (butterflies) or true leather-winged bats (the name when spoken is slurred so that it sounds like "lehrwing bats"), they are the object of superstitious awe. Certain trees in Jamaica are believed to be the rendezvous of "duppies" at night, and hence to be avoided lest the company should be disturbed. Generally speaking, all hands, old and young, would prefer not to be engaged as helpers in collecting either butterflies or true bats, which in this curious way they confuse.

I wish I knew whether these beliefs trace back to Africa. I do not think the same beliefs are entertained by any other primitive people, but of course I may be wrong. We do know that the early inhabitants of Central America used the bat in various conventionalized manifestations in designing their gold ornaments and decorating pottery. If you wish to pursue this matter, you may spend a fascinating evening reading Dr. Glover M. Allen's *Bats*, which appeared a few years ago.

I remember riding from Eau Gallie to Lake Washington on a fishing trip more than thirty years ago. This was before the lovely big pines which once grew all over this part of the state had been cut down, and the country was then as sumptuous as it is now drab and tawdry. I was riding along well before daylight when I came eventually to one enormous pine which had a great hollow limb sticking out and silhouetted against the sky. Fluttering about the end of this broken limb was a swarm of bats.

They were evidently getting ready to hole up in the hollow limb for the day, but it was not yet quite light enough to force the decision. I told my friend Glover Allen about this, a year or so later, and he begged me to go back to see if I could find the tree. This I tried to do, but it was too late. The tree was down; the lodgers had vanished.

Florida, being one of the most insectuous states in the Union, should be a happy hunting ground for bats. Scattered colonies of free-tailed molossoids can be found, but for some reason bats are seldom seen in South Florida, and the Florida red bat, which is peculiar to the peninsula, is a very rare animal indeed. In North Florida there are colonies of Tadarida. One of these, which for years occupied an old phosphate warehouse near Gainesville, had at times an estimated population of eighty thousand individuals. But when I went to see this colony the other day there was not a single bat to be found. Dr. Sherman, the accomplished mammalogist, thinks that as the building became dilapidated too much light filtered in and the haunt became untenable. But bat populations move about for reasons completely unknown to us; I have found one species in a certain cave, seen it replaced by another species, and then found the cave abandoned altogether.

A few evenings after my visit to the warehouse where the Tadarida colony should have been, I went out at dusk to the Bivins Arm Sanctuary, part of Paine's Prairie (the "Alachua Savanna" of Bartram). This is a protected area used for biological observations by the faculty of

the university. Here swarms of night hawks ("bull bats" they are called in Florida) were swooping and wheeling about in every direction, not flying high and silently, for that is not their wont in the spring of the year. Perhaps they were on migration. Far above them, so that they appeared like tiny specks against the sky, were perhaps eight to a dozen bats. I have never seen bats flying so high, and why they should be seeking their prey in such a different atmospheric zone from that occupied by the night hawks made us wonder. Supposedly they all eat the same sorts of insects, and there is no reason why the birds should have been afraid of the bats or vice versa.

Florida is full of interesting anomalies. Why, for example, should most of the eastern United States be inhabited by one race of raccoon, while within seventy-five miles of Coconut Grove there are four races of raccoon? These have been well characterized by Mr. E. W. Nelson. Several years ago, when two of my colleagues, Mr. and Mrs. William E. Schevill, were here in Florida with me, we decided to make a collection of coons and determine for ourselves whether it was possible that such a number of species forms could be crowded into such a relatively small area. We got the coons, for they are still surprisingly abundant in the southern Everglades, about the Keys, and in the southeastern mangrove swamps of the state. We found that the species were just as Mr. Nelson had described. Their little paths meander from pond to pond, as well beaten down as if made by tiny people.

Raccoons are everywhere and a very choice morsel they make for the scattered population of Indians. Weasels on the other hand are far to seek. Just after the First World War, Major Allan Brooks, who paints such lovely portraits of birds, was visiting us and he told me this story. With his easel set up back in the marsh about ten miles inland from Malabar on the Indian River, he sat at work with his brushes when he heard a noise in the leaves. He saw a pair of adult weasels and two young ones; saw them near enough to observe that extraordinary transformation which takes place when a weasel suddenly finds himself in the immediate vicinity of a man. You may have seen the same thing happen. His eyes change quickly in color to a blood-red like a fiery ruby, enhancing the malevolent leer of these devilish little beasts. I envied Brooks more than I can say, for all my life I have been wishing to see a Florida weasel. I have advertised in the papers for specimens, I have talked to old-time trappers all over the state, and I have searched steadily for years. Yet I have never seen a live one.

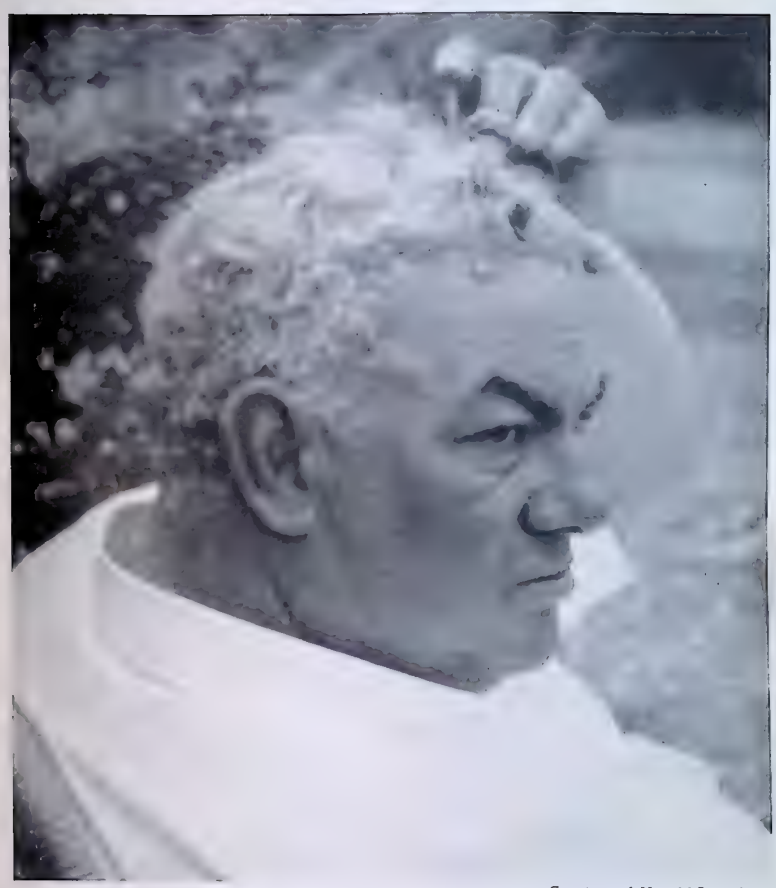
Finally last year Dr. T. E. White met a trapper up near our fossil dig. He had caught weasels from time to time and said that he would save the next one he secured. He got one in a very few days, a magnificent full-grown male with the rich, almost golden-yellow wash over the belly which characterizes *Mustela peninsulae*. This is one of the rarest small mammals in all North America. Why on earth should this be the case? Florida swarms with wild mice of various sorts, with little cotton rats, and

rabbits beyond number. There is certainly plenty of food for weasels, but there are not plenty of weasels.

Some of my readers may be surprised to learn that the beaver was once, and not very long ago, to be found in Florida. A few colonies still exist in that wild portion of Georgia along the upper reaches of the Flint River. Once they extended all the way along the whole course of the Flint River to where it joins the Chattahoochee, and down on this stream probably to salt water. These, of course, were bank beavers, which did not invade the ponds and indulge in their well-known dam building.

Recent fossils, taken from the beds of some of the streams of northwestern Florida, show that the muskrat was also an inhabitant of this region. It is difficult to see why this animal has not persisted, although there is no record that it has done so within historic times. Yet there are more muskrats across the border in Louisiana than in all the rest of America put together. In fact, the annual catch of muskrat hides in Louisiana represents the most valuable asset in the way of fur taken within the confines of the United States. Muskrat flesh is as delicate as that of the canvas-back duck, although only a small proportion of the carcasses ever reaches market; most are thrown away.

Up to a few years ago, there were certainly more otter in Florida than there were in the rest of the country east of the Mississippi. And in spite of heavy trapping, I believe this is still true. Of course the state, with its myriad lakes and widespread marshes, is particularly adapted to



Courtesy of Harold Loomis

The author in Florida

provide comfort for the hordes of otter. But why in such an environment should there be hordes of otter and yet a scarcity of weasels?

The deer of Florida are in a sorry plight. For a part of their trouble, no one is to blame but themselves. They have become completely nocturnal. If they fed by day they would be far safer. As it is, at dawn, unless the weather be very dark and lowery, each deer seeks out a palmetto thicket and hides therein. I have seldom seen deer feeding as late as ten o'clock in the morning. Now, the canny cracker, who loves to eat venison, owns or borrows a hound that will trail without giving tongue, and he makes this dog fast to his belt with a line perhaps twenty feet long. The hound travels slowly and the cracker follows the dog, shotgun in hand. Thus it is possible to flush the deer, which lies quiet until the dog can almost touch it. The open season on deer is too long and there is no bag limit.

The cattlemen of the state, who are well organized and who have always been politically powerful in Tallahassee, accused the deer of being hosts of a tick which carries cattle fever. It was not difficult to persuade the Legislature to authorize their extermination. The theory has never been proved to my satisfaction, and I may add that many agree with me. Nevertheless the cattlemen have had their way and many of them have eaten venison all the year round.

To the everlasting credit of the Secretary of the In-

terior, he has not allowed this deer-killing to go on in the Indian Reservation. Fortunately there are also several National Forests where game is protected, and if and when the Everglades National Park ever comes into being, the southern race of deer – there are several different forms which occur in Florida – will be safe. It is earnestly to be hoped that the threatened introduction of "fine breeding stock from without the state to improve the native stock" will never be carried out. Our native deer are conditioned to the Florida environment. Why make our population hybrid? The Florida deer will come back if they are ever given a chance.

As I was writing the foregoing, the annual report of the Director of the National Audubon Societies came to my desk – and it is always fun to be able to say "I told you so!" Here is what I found: –

> By agreement among the Bureau of Indian Affairs, the Florida Livestock Sanitary Board, the Federal Bureau of Animal Industry, the U. S. Fish and Wildlife Service and your Society, a limited number of deer was killed on the Seminole Indian Reservation in Hendry County, Florida, for the purpose of determining whether they harbored any tropical fever ticks. No such ticks were found.
>
> A year or so ago, some five hundred head of cattle were placed on the reservation by the Bureau of Indian Affairs at the recommendation of Herbert Stoddard, and his associates Ed and Roy Komarek,

operating as representatives of your Society; this because there is no known tick trap more effective than a cow. It was arranged that these cattle be periodically chute inspected.

We can now tell you that no tropical fever ticks were found on any of these cattle at any of the inspections to date. As a consequence, presumably, of these findings, we have been advised by the Governor of Florida that the deer-killing program will be terminated in August of this year [1943] with considerable let-up in its volume between now and then; that the termination will apply not only to the Indian Reservation lands but to all of Collier and Hendry Counties, in which it has been largely concentrated of late, in fact, to all of the state.

This is an excellent illustration of the scientific approach to a practical problem of conservation.

The tiny deer of the Lower Keys which Glover Allen and I described, calling it *Odocoileus virginianus clavium,* is safe. Special legislation has been passed for its protection and there will certainly never be any question of raising cattle where it occurs. No one now has ammunition and no one in Key West today keeps hounds.

This little deer of the Lower Keys does not change color with the seasons as does ours; it has different horns from the other white-tailed deer, and many other valid distinguishing characteristics. I wish we had called it *Odocoileus clavium* and let it stand as a full species, not

a geographic race with a trinomial. Someone once took exception to the name – which we chose with tongue in cheek, deliberately using a word meaning "of the keys." Allen's rejoinder always seemed to me particularly amusing, for he wrote: –

> In like manner the name *clavium* by Barbour and Allen for the Florida Key deer . . . was a deliberate pun, for which the authors are entirely unrepentent, while the name *keyensis* . . . would be not only an amateurishly and awkwardly coined word, but would obviously refer equally to Key Island near Papua. There are many other names that hide a bit of humor and all of which, no doubt, are a manifestation of that same twist of human nature that prompted the builders of cathedrals in the middle ages to add to the sacred structure in out-of-the-way places the faces or figures of demons or evil spirits as a relief from the seriousness of their undertaking. The Lincoln Imp is a famous instance.
>
> So they whistled the Devil to make them sport,
> Who knew that sin is vain.

Anyone who has seen the gray squirrels on Key Largo will be surprised at their little tufted white ears. You can tell at once that they are different from those on the mainland but a few miles away.

Flying squirrels are almost never seen, but are widely distributed. There is one found in the extreme southern part of the state which still needs a name, but it is so

rare that no one has sufficient material to draw up a satisfactory description. These little animals, as I say, are widespread, but with the increasing destruction of woodlands they are certainly growing rarer each year. The little gray squirrel, called all through the state "cat squirrel," is found principally in the growth of spruce pine, though by no means exclusively.

The great fox squirrels, once such a conspicuous feature of the pine flatwoods, are almost exterminated in many parts of the state. They are still to be found on the well-preserved hunting plantations between Tallahassee and Thomasville, Georgia. On a drive along the highway between the two cities, it is a rare occasion when a number of these fine animals may not be seen.

There is another and very distinct form of fox squirrel confined to the area of the high mangroves about Shark River. It is about the same size as the one on the mainland, but much darker in color. These animals can be seen occasionally, but only when they are feeding in the trees along the shore of the mangrove forest. Deep in the almost impenetrable woods they are no more than shadows.

Panthers formerly occurred all over the state, as the wildcat or bay lynx does to this day, but it is now much restricted in area and the survivors are widely scattered. I think I would rather not discuss in detail the localities where they may be found, as, if interest were stimulated to a point where hunters came in with panther hounds from the west, the last remnant might easily disappear.

This sort of thing can happen so easily when the land is as flat and as easy to cover as Florida! Nevertheless, it is no real secret that the impenetrable region of the Ten Thousand Islands in the southwest corner of the state is one of the places where they are still to be found.

I well remember one morning when John Phillips and I were trolling together along the lower reaches of Lostman's River. There was an open clearing on the bank where, for one reason or another, the high fringing mangroves did not grow, and you could look back on the shore inland and see a high shell mound. We both gasped, then looked at one another, for a panther stepped out from the woods on one side and walked directly across this little clearing in broad daylight and quite unhurriedly. This is the only time I actually saw a panther in Florida. Melanotic individuals occurred on some of the Keys and there is a skin of a young black panther which a friend, Alex Sprunt, got on Matacumbe Key and gave to the Charleston Museum, where it is still preserved.

There is not a living wolf in Florida today — although once they abounded throughout the whole state, according to the evidence: we have in the Agassiz Museum in Cambridge a skull of a fine old adult animal which was said to have been killed in 1854 in the region where the city of Miami now stands. This wolf may have been procured by Dr. Henry Bryant, who made some early trips to Florida — but the record is not definite enough for me to be sure.

Once I just missed getting a specimen, when I was told,

years ago, that the postmaster at Arcadia had a captive animal in a cage in his yard. I no sooner heard about this than I communicated with him. I found that the animal had just died and had been taken away and buried. I got Frank Carlisle to go with me to Arcadia with the idea of digging the creature up – but we found that dogs had gotten there first and there was nothing left to dig. We got a few scattered bones but that was all.

Bears were abundant in Florida down to well within my time. I saw their tracks on a number of occasions where they had been walking the ocean beach waiting for the loggerhead turtles to come ashore and lay their eggs – which usually happens about the time of the full moon in May. There are a number of bear skulls in the Museum which Grandmother sent me for the collection while I was an undergraduate in college. I do not remember hearing that she ever killed any of these animals herself, although I know that she did kill bear elsewhere. I am sure she ate every piece of bear meat she ever had offered to her, for she was very fond of it.

The Florida bear was an enormous animal, the largest of the considerable number of black bears which have been described from various parts of North America. Inhabiting as it did a country which was so easy to hunt over, it disappeared rapidly, and I suspect that today there are only two or three areas in the state where any at all survive. They are rarer even than the panthers.

There is a vast deal of work still to be done on the mammals of Florida. New forms are still to be worked

out, their distribution still to be determined, their names to be bestowed.

For some time to come, the Keys will be, I imagine, a worth-while hunting ground for some vigorous fellow who doesn't mind mosquitoes. I mind once seeing a coon walking along just back of the beach on, I think, either Ramrod or Torch Key, accompanied by a moving cluster of mosquitoes so compact that only occasionally did enough coon show to indicate the cause of the perambulating swarm of these villainous, pestilential little insects, which are as bad at times in the Keys as they ever are in Labrador in summer.

CHAPTER XI

The Florida Ditches

NO STATE in the Union has been more widely ditched than Florida, and no state has suffered more in the process or been more extensively – albeit fortuitously – beautified. Years ago I planned to write a book on the ditches of Florida. Please don't laugh, because they really are a good subject for serious study.

The ditches fall into two categories: those made for drainage purposes, and those made in connection with road building. Florida is flat or gently rolling; hence the way to make a road is to dig along both sides of the right of way, pile the spoil in the middle, and flatten this down for a roadbed. Because the material dug out to make them has been completely disposed of, roadside ditches are relatively permanent.

Drainage ditches, some of which are enormous canals, are not permanent. The spoil is piled up on the sides, and sooner or later the torrential rains of spring and summer wash the banks back into the ditch. Years ago, when it became the fashion to dig these drainage ditches, all sorts of benefits were recklessly promised, including millions of acres of land which were going to be opened to agriculture. What really happened was that the size of Lake Okeechobee was greatly reduced and the warm

waters were drained from the Everglades. Since these waters were a God-given aid in warming the air when cold northwest winds swept down, the climate of southeastern Florida changed for the worse. Now extensive dams have been installed in the Okeechobee region to prevent the great ditches from carrying off the water too fast.

It must be admitted that the drop in the level of Lake Okeechobee produced a large area of fine truck land. What in the old days was called the Custard Apple Ridge, around the lake, was perhaps the richest agricultural land in Florida. It is true that this zone has been greatly extended by lowering the lake level, but fire has played havoc with the dried muck. After a few dozen severe burnings, the Everglades have in part become a waste from an agricultural point of view. John Small records deep, rich muck, all vegetable humus, burned down to a clean white sand in a fire which smouldered for months on end.

The deep drainage ditches received a concentration of fresh-water fish, and in the early days I used to troll regularly in the one which ran from Lake Okeechobee to West Palm Beach. The lateral canals, called the range-line canals, swarmed with alligators and turtles and big-mouthed bass. Many of these canals are now choked with bonnets. The canals have been fished out, the gators killed off, and enough sand has washed in from the banks so that there is not much water in them, except after very heavy rains.

The giant shallow basin in which the Everglades lie slopes gently to the south, and when the Tamiami Trail was laid out, deep ditches had to be dug to provide material for a road high enough to be out of water during the downpour which comes with occasional hurricanes. This road would be a dam across the entire region, were it not for the innumerable culverts and bridges along its length. The aquatic life of the whole Everglades section, apart from a few depressed areas where water has persisted except in periods of great drought, has been gradually concentrated in the ditches along the Trail.

I intended to write my book about these roadside ditches, which border hundreds, indeed thousands, of miles of highway in Florida, and present an extremely interesting field of investigation for the naturalist. After the ditches were dug, an enormous variety of animals and plants seized on this man-made environment and took it for their own.

Let me give you a few samples. Suppose we are driving from Gainesville to the Thomas farm. Not very many miles west of the town the road cuts through a cypress swamp. The cypress was not good enough for timber, so fortunately it still stands. Bearded with moss, it is also covered with delicate pale green when its needles shoot forth in the spring. Innumerable wild flowers carpet the dry stretches among the trees, but most of the cypresses stand in shallow water, which is of course deeper along the side of the road where the roadside ditch runs.

This ditch is filled with that interesting little aquatic carnivorous plant, Utricularia, which catches tiny fishes. Its blossoms shoot up about four inches into the air. Each one of these tiny flowers is a yellow ball, like the individual flowers of an acacia, and these little heads come up so thick that the effect is one of a mat of fine gold.

I remember one occasion when my wife and I were driving across Paine's Prairie, again not far from Gainesville, in early July. This prairie is the result of the underground seepage of a very large lake. In limestone country such as we are discussing, it is not unusual for a "plug" to fall out of the bottom of a lake, which will then disappear. Paine's Prairie tends to become a lake again from time to time but is discouraged by cattle owners, who find the grazing so excellent that they keep the outlet open with dynamite. The cattle graze mostly while wading, for the area is never wholly dry. White egrets, and ducks, and birds too numerous to catalogue, make Paine's Prairie an ornithological paradise. The causeway is some twenty feet above the prairie level, to thwart the prairie should it seriously and suddenly decide to become a lake again and make sport of human efforts. This means, perforce, that the roadside ditch through the prairie is deep.

On the occasion to which I refer, when we were motoring southward, we came down the hill leading to the prairie causeway from the north. Stretched out before us was a scene difficult to describe, for the ditch had grown up and become completely filled with water hyacinths. It seemed that every single one of them was

Pelican Island. The first bird sanctuary in North America, set apart by President Roosevelt and now abandoned by the pelicans

Egrets and "jackdaws" waiting for their evening meal at a drainage runoff from the drying Glades

in bloom. They looked as if a great mauve carpet, about sixty feet wide and three to four miles long, had been stretched along beside the road. Rosamond said instantly, "That beats any flower show in Japan, and yet we have never heard of it before." This was ditch beauty on a lavish scale. It is not always thus.[1]

I should like to take you to a puny little ditch not far eastward from Eau Gallie, on the road towards the St. Johns River marsh. This passes near a dairy, and the cattle come to drink and tread down its sides. The region through which it runs is part of the waste lamented earlier in this book; it is completely denuded of what was once a glorious stand of long-leaf pine.

But stop and look at those white flowers. They are a pigmy water lily perfect in every detail, just like the great white pond lilies which you may see by thousands in the roadside ditch where the road west from Melbourne crosses the St. Johns River marsh. These little lilies are fairy blooms scarce the size of a half dollar and with the most delicate floating leaves. I had never seen them anywhere else; and, being no botanist, I once took along Archie and Margie Carr. They, too, had never seen the pigmy lilies elsewhere. I have gone to see these blossoms year after year for a long time with great enjoyment.

I must not leave this subject of the roadside ditches without pointing out that they are of real interest to

[1] On May 30, 1944, a large part of the prairie was covered with bloom as well as the ditch. To the hyacinths were added golden lotos in bloom. The effect beggars description.

zoologists as well as botanists. Horton Hobbs has made a detailed study of the crayfishes of Florida and incidentally raised the number of named forms known in the state to forty-two from the ten that had been reported before he began his studies. Of these forty-two, no fewer than nineteen have invaded the ditches and are frequently found there.

An interesting amphibian, the so-called "congo eel" – which is no eel at all, but a gigantic salamander-like creature with short stubby legs – has invaded the ditches to such an extent that Archie Carr believes 90 per cent of the total population of this animal has migrated to this environment. The same thing has happened with the tiny Cyprinodont fish, one of the group of little fishes in which the eggs hatch within the body of the female and the young are born alive. It is called *Leptolucania ommata.*

I shall not attempt to list the many species of frogs, snakes, and turtles which the naturalist may find, but many times I have driven along the roads of Florida after a heavy rain in the spring and listened to a bewildering chorus of amphibian voices. One drives along over a high sandy ridge, the ditch is dry, and there is silence. One dips a few feet to a swale and the voices rise in frantic crescendo, so that it is impossible to speak to the person who sits beside you in the car.

Years ago, George Nelson, the chief preparator of our museum, found that the ditches near his winter

home at Sebastian were prolific collecting grounds for most attractive little aquarium fish. His room was gay with tanks swarming with dainty fishes, such as the pigmy perch, Heterandria (one of the tiniest vertebrates in the world), mollienisias, gambusias, and several other lovely species of Fundulus.

Of course, those ditches running beside long stretches of road through uninhabited country, where few cars pass, are usually the most interesting. I once saw a pair of otters playing in a ditch, and they seemed to me to be nearer to the embodiment of pure joy than any other creatures I ever saw. Smooth and sleek and brown, they rolled about looking like a pair of animated rubber animals. One often sees gators. I saw a six-footer once that was obviously planning a meal of pork, for he was watching a brood of merry little pigs busily rooting near the roadside. The edge of the ditch is a favorite nuzzling ground for hogs over a large part of Florida and Georgia, where there are no fence laws.

Then there are the birds. With protection, the snowy egrets, commonly known in Florida as the "short whites," are now, I think, the most abundant ditch-side bird in the state. In my youth you could spend a day on the most perfect feeding grounds and not see one. They may not be very much more abundant than their allies, the "long whites," but they are more often seen near at hand, since the "long whites" prefer larger bodies of water to feed in, and are more shy.

Going out to see the birds on the Tamiami Trail is

one of the great tourist activities of the state — that is, for those who do not visit Florida for gambling or horse racing alone. The deep ditch on the north side of the trail is still teeming with fish, and it drains such an enormous area that after heavy rains there are large spaces which are low enough for the water to back up and stand, and where as yet the fires of the dry winters have not destroyed all humus soil and all animal life. When conditions are just right the concentrations of herons, ibis, and "flintheads," as our only native stork is called here in Florida, make one of the most enchantingly lovely scenes that can be imagined. Thanks to the excellent work of the wardens employed by the Audubon Society, these birds have increased to a point where it is to be questioned whether the area will support a much larger population.

You will see many birds besides waders along the Trail. There will be ducks and coots and gallinules as well as the handsome boat-tail grackles — "jackdaws," we call them down here. In spring these display the metallic greens and blues of their plumage with much bowing to their lady loves and blowing up and fluffing of the feathers on their throats as they pour forth their loud and cheerful, if somewhat raucous, songs.

If you ever drive over this interesting road, don't fail to stop about sixty miles after you leave Miami, where there are a number of bridges a little wider than average. These are the places where the Trail crosses the extreme upper waters of Turner River, Lostman's River, and

the other streams which flow down and empty into the bay of the Ten Thousand Islands. Here the Indians still have waterways on which they can travel with their dugouts; and to look down these channels under the overarching trees is to be granted a glimpse of fairyland. Look down in the water, too, for the best natural freshwater aquariums that you will ever see. The water is crystal-clear and the gars, grindles, breams, and bass swarm in countless numbers.

If you are sharp-eyed and fortunate in finding the orchids in bloom, you may well see the white star-like flower of that curious leafless plant, Polyrrhiza. In this strange orchid the chlorophyl which takes care of its nutritional needs is concentrated in the long spidery roots which stick fast to the bark of one of the trees hanging over the water, its usual preference being for the pond apple. I know of but one place where this superb orchid is really abundant, and that is in the Royal Palm Hammock over in Collier County. The full name of this orchid is *Polyrrhiza lindeni,* and the single flower which it bears is one of the largest borne by any species native to Florida.

Archie Carr recalls several ditch streams, not far from the Royal Palm Hammock in Collier County, where the waterway passes through dense thickets, so that no direct sunlight penetrates its borders and one may wade about waist-deep in a natural hothouse. In the summer, he declares, the blooms of the leafless orchids sometimes make a fragrance which is so heavy that it is nauseating.

In one place, he saw half a dozen species of orchids in bloom at the same time.

On the western end of the ditch of which I have been writing, there are natural waterways leading down to salt water which is fairly deep at high tide. At times many salt-water fish run inland, so that after the great freeze of 1934 hundreds upon hundreds of giant tarpon were killed in the ditch by the cold, to the great enjoyment of the buzzards and black vultures — but of no one else, even if the wind favored him.

After heavy rains the tributary run-off rivulets from the usually dry marsh along the Tamiami Canal swell to little torrents, and the run-off from the Glades makes innumerable rills, each of which has built a miniature delta. On these high water days it is extremely amusing to watch the strife between the soft-shelled turtles and the gars. They lie in wait, frequently in most surprising numbers, for bits of desirable flotsam which may be carried down by the flood, and the competition is violent as they snap and tear furiously at any bit of food which may appear, until it is rent in pieces and swallowed. I remember one year when a cloudburst followed a fierce grass fire, and the carcasses of many very ripe rabbits and coons came floating down, to the immense delectation of the waiting throng of fish and reptiles.

There is not much difference between high tide and low tide around the southwest coast of Florida, but at full moon, especially if there are heavy southwest winds at the same time, lots of salt water gets into the ditch and

there is good fly fishing for snook right from the bank of the highway. It is a curious fact that these fish, which when taken at sea are among the best and most delicious there are, soon grow quite inedible in fresh or slightly brackish water. After a few days in the Canal, their flesh becomes soft and tastes most disagreeably of mud.

Roadside ditches, of course, are filled with water only after heavy rain, unless the road passes through one of the myriad shallow ponds or marshes scattered over Florida. They abound in the vast areas of the state which the casual observer from the North never sees. I can only beg or advise the nature-loving visitor to keep off U. S. Route No. 1 as far as possible, and zigzag back and forth across the state over the roads which the map shows to pass through the smallest number of villages and towns. Drive slowly and keep your eyes open. If you do this, you will agree with me that in these ditches a potential eyesore has been transmuted into a scene of constantly varying interest.

CHAPTER XII

The Garden of Eden

1. Hammocks and Forests

FLORIDA contains no less than 3512 species of plants. Such streams as the Apalachicola and the Chattahoochee, often in flood when Florida is dry, have played a large part in the distribution of this flora, particularly in the northeastern Panhandle. These and the other rivers of the area rise far north in the highlands, and though they may flow only a short distance through Florida, they bring in the seeds of many plants. This Panhandle area, which has such botanical specialties as *Rhododendron Chapmani*, is noteworthy to my way of thinking, chiefly for its wonderful spring show of lupins and heaths, which bloom along dry sandy areas a little way inland from the beach at intervals all the way from Apalachicola to Pensacola. These heaths are very fine, comparable to those in South Africa in the early spring, and it is well worth making a trip just to admire them alone. I have been lucky enough to see them on several occasions.

In Florida, according to Dean Harold Hume, there are 314 species which may be justifiably classified as trees. That this is a prodigious variety you will recognize

when I say that only 147 species of trees are to be found in the Pacific coastal area from Vancouver to Mexico. The pine lands of Florida have relatively little admixture of other species, thus the great variety of trees is concentrated in certain areas, especially in the hammocks.

The foliage of the trees of Florida in springtime looks entirely different from that of New England, for instance. The greens of the many species of oaks, ashes, magnolias, and hornbeams are singularly metallic and glistering, the surfaces of the leaves appearing as if they had been polished and reflecting the sunlight in a manner quite dazzling – totally different from the way in which light is reflected in our northern groves.

I set out the other morning just at sunrise to walk through a beautiful hammock in northern Florida. There had been torrential showers during the night, but dawn had come with the air absolutely still. Just as the sun rose into a cloudless sky, its rays searching out every open spot in the canopy of woods, a sudden breeze sprang up and the leaves began to shed the droplets which they had carried during the night. The effect was so lovely and so surprising that I stood still and caught my breath. It was as if a hard rain were coming down, with the sun shining from the horizon and the sky without a cloud.

Hume tells of driving to Starke at early dawn to see the celestial lilies, which carpeted the ground with their pale mauve forms. On his return a few hours later, every trace of the blooms had disappeared. The flowers

had unfolded, been fertilized, set seed, and withered, all within the space of a couple of hours.[1] I have never had much chance to see this particular spectacle, although I vaguely remember as a boy seeing lilies of this sort near Eau Gallie, which is one of the stations where the plant is known to occur. When the woods are starry with the beautiful Zephyranthes lilies, God is kinder to the world, for they last for days, their white, upright chalices suffused with a delicate rosy pink. I think this is almost my favorite flower.

The University of Florida is the best equipped in North America to teach fresh-water biology out of doors. Here, for instance, the number of species of singing amphibians in spring may reach to sixteen at one time. Here the spring woods are snowy with Zephyranthes lilies; and the stands of hardwood are overrun with vines bearing the yellow bells of the Confederate jasmine. These woods are also abundantly sprinkled with the largest dogwood trees in North America. Indeed, for years unnumbered the looms of England have been provided with bobbins and shuttles made of "Tallahassee dogwood." Now add to this the redbud and the white star jasmine, which has run wild in many places, and the Cherokee roses. (Everyone has so completely forgotten that this rose originally came from China that it was considered, if not actually adopted, for the state flower of South Carolina.)

[1] If you want to know the story of this lovely flower, read what J. K. Small has to say in the *Journal of the New York Botanical Garden* (1931, Vol. 32, pp. 260 ff.).

A marvelous outdoor laboratory for the teaching of biology at the University is the Devil's Mill Hopper, a "sink" of extraordinary beauty and a hundred feet deep. This part of Florida is beset with many "sinks," which are simply caves in the limestone where the roof has fallen in. Most of them hold water, and when their underground outlet clogs, water may be twenty to forty feet deep in them; but the Devil's Mill Hopper now is dry; there is no lake at the bottom and the tiny silver streams which purl noisily down its sides disappear into the earth as they reach the bottom of this vast hole in the rock.

But it is for more reason than this that the Devil's Mill Hopper holds particular biological significance. The rocky sides are shaded by great trees growing around the edge of the sink, the cool water drips down stony walls carpeted with fairy ferns, liverworts, and Selaginella. Thus the bottom of the "hopper" is far cooler than the top. The locality has been thoroughly investigated by the biologists of the University, and strange as it may seem they have found insects at the bottom of the sink which occur elsewhere only at an altitude of several thousand feet in the mountains of the western Carolinas and Georgia.

At Bivins Arm, a detached portion of Paine's Prairie which is still a lake, one may see the domed houses of the round-tailed muskrat (Neofiber) in a tangle of aquatic vegetation which is a botanical garden in itself. By wading in the lake, rolling up a mass of this floating plant life, and pushing it up the bank, one may find a

myriad of small, shy, and little-known reptiles and amphibians, to say nothing of insect larvae and Crustacea.

Flourishing rookeries of ibis and herons give an ideal opportunity for studies in avian sociology.

I will go so far as to say that no university in the world is so well placed for the study of fresh water biology as the University of Florida – unless, perhaps, it be Judson College at Rangoon.

What a difference the woods of the southern part of the state present, where there are hundreds and hundreds of species, all those familiar to one who has traveled in the West Indies! No greater contrast could possibly be found within the borders of any other state in our Union.

Several times I have used the word "hammock," and I recall that once upon a time in Cambridge, about twenty-five years ago, I had occasion to use this same word in my annual report. The then Director of the Museum changed it to "hummock," and I pleaded in vain and explained in vain – "hummock" it stayed.

It might be well worth while here to try to explain what hammocks really are and how they may be classified. I have a most knowledgeable ally in Dr. Archie Carr. Standing to him as I do more or less *in loco parentis*, I shall plagiarize and copy from him most shamelessly to amplify my own information.

He has pointed out to me that in coastal Georgia "hammock" means an island in a salt marsh – either an

island of cedar trees, or an island of cabbage palmettos. In Florida the word has a far wider application and is used for any hardwood forest. Unfortunately hammock soil is very fertile, since the deep accumulated humus makes a rich cover. Therefore, in the south of the state where the hammocks are covered with the infinitely varied but seldom large tropical trees, they invite cutting over so that the farmer can get at the rich soil. In the center and northern part of the state the hammocks are equally vulnerable: here they often bow to the lumberman's axe.

Some of the Keys were almost solid hammock years ago and in the early days of Florida's settlement they provided fine Jamaica dogwood, lignum vitae, mastic, and mahogany for shipbuilding. In the truly tropical jungle of the southern tip of the state and the Keys, there are many hundred species of woody plants which are unknown elsewhere in North America. In these areas, the illusion of a typical tropical forest is complete. Anyone who has had the experience will recognize what I mean when I say that here one seizes the trunk of a little tree to press it aside and make room to walk by, and finds that one has grasped something about as yielding as an iron rod. The curious spicy smell of a tropical jungle is unmistakable, and is as characteristic to the nostrils as the smoke drifting downwind at evening from a village in India.

At least 90 per cent of the truly tropical hammock land in Florida has now been destroyed. The few

cherished areas in private hands are being preserved. With most praiseworthy forethought and generosity, a section of the Brickell Hammock has been preserved in memory of Dr. Charles T. Simpson, and Mr. W. J. Matheson has presented to Dade County a lovely hammock which adjoins the Fairchild Tropical Garden. This serves as a fine demonstration area of the native tropical flora of this very specialized region of our country. But it is a sad sight to drive by the truck gardens which now cover the localities where a few years ago one wandered through lovely virgin growth.

How many hammocks throughout the southern Glades have been ruined by fire, I do not know, but I do know the number to be very large indeed.

Paradise Key, its beauty fortunately appreciated by the Florida Association of Women's Clubs, was bought up and made a reserve and a warden was established in residence. This was done because of the glorious stand of native royal palms, which pushed their lofty heads high above the top of the lower forest growth. Here again the inroads of fire have seriously injured the beauty of what, to my mind, was once the most romantic hammock in all the southern tip of the state.

Scattered throughout almost all of these areas are rocky sinks, usually not more than six or eight feet deep, and often as large as a Cape Cod cottage. These help to retain moisture, and their walls are always covered with the finest and most delicate of ferns in great variety. When the areas are burned off or cleared off these sinks

usually become what are known as "banana holes." Because of the accumulated humus, the dampness, and the great protection from injurious winter winds, banana plants grow singularly well in these depressions.

I have visited the Highland Hammock at Sebring on a number of occasions with great pleasure. This tract of land was bought by a philanthropic woman and presented to the state. The vegetation is not perhaps so varied as it is in some other hammocks either north or south, but there are many very fine live oaks and I am sure that I am not exaggerating when I say that there are hundreds of the tallest and finest cabbage palmettos in the state clustered together here. The palms mixed with the broad-leaved hardwoods are inexpressibly stately.

In the lowland adjoining the hammock, the cabbage trees are absent. Here only the hardwoods grow, standing in about a foot of water, and the effect of the sunlight filtering through their branches to strike the water beneath is unique. Raised wooden pathways make it possible for visitors to enter and enjoy an environment typically Floridian and one which only naturalists or hunters ordinarily see because they alone are willing to wade into such places. Here there are some deep sloughs choked with bonnets, where you can hear the big bass strike when the sun is hot, and watch the dragonflies swing back and forth over the patches of open water and see a gator or two if you don't make too much noise. It is a pity that this area is not a little larger so that it

might support a large population of wild life, nevertheless there are some deer and turkeys which are carefully protected and every possible precaution is taken by plowing and ditching to see that no fire gets to this lovely spot.

Another widespread type of hammock is that composed of the magnificent magnolias, the fine old holly trees, blue beech, and ironwood. I said "magnificent magnolias" fully aware of the significance of the adjective which I was using. I have seen a few magnolia trees no less than one hundred feet high, and any number ninety or over. One giant I have visited repeatedly stands on the brink of a little ravine in a most lovely woods, and in circumference is thirteen feet and a half at the level of my chin, which is just about six feet above the ground.

Magnolia wood is white and fine-grained, and these great trees are in demand, since sections of their boles make ideal chopping blocks for butchershops. They flower very irregularly, some blossoming as early as the twentieth of April, others in May, June, and even well into July. To stumble on one of these forest giants, its enormous white flowers set forth by the shining dark green of the foliage, and the blooms peeping out from among tangles of mauve-gray moss, is breath-taking and unforgettable.

I have been writing here about the climax forest, in which the partridgeberry is almost diagnostic. Occurring over much of Florida from the lake region northward, it is called climax because the dense shade prevents the development of all but a few species of shade-tolerant

seedlings, leaving the floor of the forest open for long vistas. South of the central portion of the peninsula, this association is modified by the gradual incursion of tropical species, so that the variation in the types of hammocks from north to south, through the state, is infinite.

I love hammocks. To me, each has a real individuality and each conveys the charming illusion that one is exploring even when one is simply walking on a man-cut path. The areas of the north, both "low" [2] and "high," I think the loveliest of all. They have suffered as the others have, and now many hammocks are gone. But in the early spring, when the yellow jasmine festoons the forest trees and when the redbud and giant dogwoods and the maples are putting forth their vivid crimson foliage, I do not know of lovelier spots to sit listening to birds and resting in the heat of the day.

Years ago I once got off the train at Miami with my wife, hired a colored man who had a horse and canopy-top wagon, and drove along lovely narrow wood roads. A few moments' drive from the railway station, I made a good collection of multicolored tree snails, which are treasured to this day in the Museum, being irreplaceable. Today the remnants of the great Brickell Hammock, the most extensive tropical hammock in the state, exist only as little remnant plots along South Miami and

[2] A "low" hammock is a term applied to woods growing on low, wet or flooded ground.

Brickell Avenues, Miami, and in the larger space of the Simpson Memorial Park. By using the most vivid imagination, one can hardly picture how luxuriant this whole region was before man took it in hand. But cities have to grow, however unfortunate this may be for the natural features surrounding them.

I am minded to record here a wholly irrelevant experience which happened in 1944. I was dining with some friends at a popular seafood restaurant in Miami, on a second-story balcony which gives directly on the Miami River. I was musing over the changes that had taken place since I first saw that stream wandering through its natural banks forty-five years ago. Now for miles there are nothing but fish wharves, boat yards, and the general foreshore of commerce and trade. The water is indescribably polluted. Suddenly, we all opened wide our eyes — looked, and then looked again — for sculling slowly down the middle of the river, with everything from fishing dories to submarine chasers moving up and down on either hand, moved slowly, leisurely, independently, the oldest inhabitant of the land: a manatee.

He cruised along as if entirely conscious that this was indeed his own domain; here he was no intruder, and he knew it well. The very density of population in the area through which he traveled was his own protection, for eight hundred pounds of meat as good and as tender as veal is a temptation to man in any day or generation. Swimming along in the Miami River must have been a

rather unsavory pastime, but this old "sea cow" was probably as safe a bet to live another year as any member of his vanishing clan in the entire state.

2. "Moss" and "Airplants"

A curious confusion exists in the minds of many people concerning which epiphetic plants are orchids and which are not. While the number of epiphytes in Florida is not so great as it is in Jamaica, where the rainfall is heavier, there are a number of species in the state. The best known and most widespread is the Spanish moss – which is not a moss at all, but a plant belonging to the same family as the pineapple.

This tree moss has a considerable economic value. It is dragged down from the trees and piled up in what are called "moss-yards." There it is wet down with water and turned over occasionally, until it finally rets, and the black inner fiber, which is a sort of axial skeleton of the plant, can be gathered up and baled. Formerly this was used by the country people to make mattresses and was worth a cent a pound in good times. Now, however, the automobile industry has found that fiber like this makes quite a satisfactory stuffing for seats and cushions, and the price has risen to the unprecedented sum of five cents a pound; so that "mossing" pays well. The country all around our dig, which is in an area of post oak scrub – a fairly good host plant for moss – is now pretty well denuded by the activities of our neighbors.

The Spanish moss (botanically Dendropogon) grows freely on citrus trees, but its chief association is with the liveoak and the water oak. Both these trees grow to enormous size and, as they are frequently planted along roadsides and avenues, they make up the characteristic moss-festooned vistas so familiar and so beloved in South Carolina, Georgia, and northern Florida. Spanish moss grows in southern Florida, but it is not abundant nor is it a characteristic feature of the scenery.

In some parts of the Everglades almost every one of tens of thousands of cypress trees is liberally studded with clumps of bromeliads, mostly of the genus Tillandsia. These bloom abundantly, beginning in April, and while the flowers are inconspicuous, the little red and blue flowerets are most attractive. So much so that latterly it has been the habit of the five-and-ten-cent stores in Miami to send great trucks out into the Everglades to tear tons of these plants loose from the trees upon which they have grown for long periods of time, to be carried back to town, potted, and sold. They are bought by all and sundry as "airplants," at a nickel or a dime each, according to their size. Since all of these potted plants ultimately perish, this is just one more example of the way the natural beauty of Florida is being ravished.

3. The Strangler Fig

It is interesting to speculate on how the tropical rain forests of the world originally came into being. For

we must remember that a very considerable number of those trees require shade while they are young plants. When this fact is taken into consideration, the live-and-let-live or altruistic aspect of the biocoenosis comes to mind rather than the much publicized "struggle for existence," and survival of only the fittest, which has been drilled into most readers. To be sure, emphasis on relentless strife and competition facing tropical forest plants makes a basis for a more sensational story than the other concept. It was John Phillips who, years ago, pointed out to me that this emphasis on the struggle for existence was only part of the picture.

Nothing epitomizes the traditional cruelty of the tropic forest as does the strangler fig. This is a wide collective term for epiphytic trees which are not all figs – as, for example, the cupay (*Clusia rosea*), so common in Cuba; but the great majority of the stranglers belong to the enormous genus Ficus.

The common strangler of southern Florida is *Ficus aurea*. This is one of the innumerable species of which the fruit is eaten by birds, and the seeds, passing through the bird's intestines unharmed, are deposited hither and yon by chance.

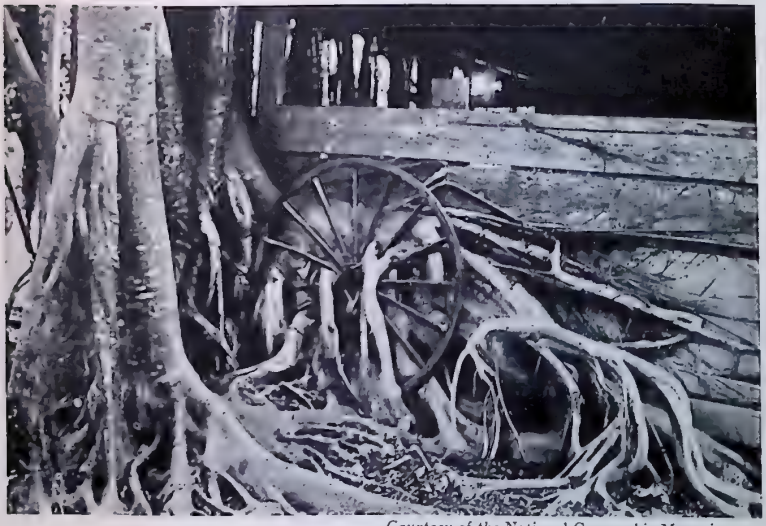
A certain proportion of these seeds naturally fall on branches near the trunks of other trees growing in the forest. When the seed germinates, its roots creep about the host, anastomose, thicken, and gradually reach to the ground, while the branches push upward as they seek the light. With the passage of years the fig forms a basket

of heavy, strong bands around the tree. Finally the host, so choked, sickens and dies, and it is not uncommon to see the fig remain as a columnlike network of intermingled branches surmounted by a tall growth of boughs with glistening, leathery, oval leaves. The form of the column clearly indicates that the original host has rotted away and disappeared.

Stranglers often grow on stone walls, on roofs of houses, and on rocks, and Harvard University owns a sketch by John Singer Sargent which shows the process of the capture of a cartwheel leaning against a stone wall. I wondered where this sketch was made, and wrote David Fairchild. He replied, "I used to go out with Charles Deering and examine that old wheel. He had John Singer Sargent visiting in his house at Cutler and it was then that his marvelous sketch was made. The tree stood beside the Garage in the Cutler Hammock which Charles Deering has preserved, bless his heart."

In the beginning our strangler fig is a true epiphyte, having no connection with the ground. Immediately the roots, being geotropic, tend to grow downward. At first they are slender, but when they reach the ground an increase in diameter takes place at once. In the meanwhile, slender aerial roots drop from trunk and branches, and as they in their turn touch the ground, thicken and form columnar trunks. The tree is beginning to "banyan," as a localism has it. Of course, by this time the strangler has ceased to be an epiphyte in the strict sense and has become a true terrestrial plant. Long before the

The Colohatchee River covered with floating vegetation



Courtesy of the National Geographic Magazine

The strangler fig on the Charles Deering Place at Cutler, Florida

host tree dies, the fig has become perfectly independent. Charles Sargent says, "What is probably the largest specimen of *Ficus aurea* in the United States grows on a wooded hummock, locally known as 'The Hunting-ground,' about ten miles west of the mouth of the Miami River and close to the shores of Bay Biscayne. This remarkable tree covers about a quarter of an acre of ground with its numerous distinct stems formed from roots developed from the branches of the original trunk, and its dense wide crown of foliage." When a large specimen of this species is encountered, it is difficult to believe that its source was a small epiphytic plant that began its development, perhaps many feet above the ground, on the branch of another tree.

The strange behavior of *Ficus aurea* is explained by its need for light. Light is essential for its successful development. If seeds fall on the forest floor and lie in dense shade they remain dormant. This explains the epiphytic habit of the species in tropical jungles where only those seeds which fall in well-lighted situations on the branches of trees are able to germinate. Occasionally, however, in clearings and open places, it has been found that *F. aurea* is quite capable of growing independently, and along rocky bluffs and on canal banks young plants may be found that are not epiphytic.

Although Ficus is a large genus comprising more than six hundred species, with representatives in both hemispheres, only two species are natives of the United States, the other being *Ficus brevifolia*. Some of the best known

foreign species are: *F. carica*, the edible fig, probably a native of the Mediterranean region, cultivated from prehistoric times; *F. religiosa*, the Buddhist's sacred Peepul tree, found near temples and shrines in India and Siam and now a much-planted shade tree in tropical countries; and *F. bengalensis*, the famous "Banyan tree" of India. Both *F. bengalensis* and *F. religiosa* sometimes become troublesome when they germinate from seeds that have lodged in the crevices of the walls of buildings. *F. religiosa* has been known to break down the strongest type of masonry in countries where the tree is so sacred that nobody will destroy it.

4. Floating Vegetation

In no region in the world is one more frequently interested and impressed by the floating vegetation than in Florida. First there are the floating plants themselves: the water lettuce (Pistia), which is native, and in some places an introduced floating fern (Ceratopteris), a lovely and delicate plant of palest jade green; and then the pestiferous water hyacinth (Creatopus), introduced from Venezuela.

Mrs. W. F. Fuller, a winter resident of San Mateo, visited the New Orleans cotton exposition of 1884 and got some plants of this species — in those days usually called Eichhornia — from the Venezuelan exhibit. She brought them back to Florida, and they thrived, becoming too many for her fish pond; so she tossed some into the St. Johns River. In a few years the plants had

covered millions of acres of water, and they continued to lace together their strong, thick roots so that rafts were formed which hindered the navigation of the river. Today something over a million dollars has been spent to control this pest: the Government uses small launches equipped with circular saws, which cut up these roots so that the plants may float out to sea or be hauled ashore.

Cattle wade in where the bottom is hard and feed avidly on the water hyacinths, but they do not make good fodder and are not nutrient. In late spring, however, they carry tall hyacinthlike spikes of mauve blossoms; when these carpet extensive areas, as is often the case, the scene is exquisite, for the color of the blossoms, carrying no suggestion of purple or magenta, is one rare and unusual in nature.

Where large lakes have been invaded by this floating plant, the great mats move across the open water from one side to the other as the wind blows, but it is the "floating islands" which so radically change the whole landscape. These I think have a rather simple, though at first sight unexpected, origin.

Florida is subject to long and not infrequent droughts, followed by torrential downpours of rain. During droughts in times past the exposed muddy areas bordering the St. Johns River and many of the lakes grew into dense, tangled masses of vegetation. Then a sudden rise of water floated up these mats of vegetation, which may have been from a few square yards to many acres

in area. Once one of these islands became a float, it was blown about so frequently, and the bottom of the mat of vegetation was scraped over the lake bottom so often, that it became lighter and more buoyant, while the water nourished the vegetation. Sometimes such lakes as Orange Lake up near Ocala, or Lake Washington at the head of the St. Johns River, appear almost unrecognizable, because the size and space of the bodies of open water vary so completely. Occasionally these floating islands become, for one reason or another, securely anchored, and are again a more or less permanent feature of the shore. This may be the case where the water rises slowly and some plant like the parrot's-feather or coontail (Ceratophyllum), with its floral associates, grows up in such masses as to hold the island fixed in place.

I may say that the growths of coontail, which rise above the surface of the water in late spring or early summer, are beautiful beyond exaggeration. The delicate little fronds or tufts, growing so thickly as to touch one another, appear like miniature representations of prehistoric vegetation; and if they happen to be mingled with the acacia-yellow pompoms of the carnivorous Utricularia, you have something worth seeing. The large islands are usually composed of willows, frequently mixed with buttonbush (Cephalanthus) and water oleander (Decodon). They are often the errant nesting places of cormorants, water turkeys and herons.

Many of these islands and much of the floating vegetation was found aground in the spring of 1921, which

was the driest in many, many years throughout southern Florida. No rain fell during March and most of April. The ponds throughout the piney flatwoods were very low or even completely dried up, and large lakes were much reduced in area. Probably this condition was partly responsible for the peculiar episode which I intend to record here.

I was fishing once for bass in the upper St. Johns River, above Lake Washington where the river is a narrow, sluggish stream. I have always camped on a willow tussock to cook my midday meal. I chose among the few not afloat one located in a shallow slough, which offered about the only chance to build a fire in this boggy country. This year the water in the little bayou was low, and the water hyacinths and lettuce plants and many of the willow heads which are usually afloat were resting with their roots on the mud in the shallows. The vegetation swarmed with big, long-legged spiders of the genus Dolomedes. These spiders seem to have a predilection for creeping about on the floating lettuce plants, especially. The water beneath the plants, and such as was left now in the little open spaces between them, teemed with several species of small cyprinodontoid fishes, of which a Gambusia, beyond doubt affinis, was the most abundant.

After eating my grits and drinking my tea, I rested quietly in the stern of my boat, which was partly hauled up on the tussock, quite motionless. A tiny flash of silver caught my eye; I looked again, to see a spider carrying

a small dead fish perhaps an inch long across a wide leaf to the dark interior of a large lettuce cluster. I thought that probably the spider had found a dead fish by chance, and I went back to my pipe. In a moment about six feet away in another direction the episode was repeated. This time the little fish was still struggling feebly in the spider's chelicerae. Later I saw a third fish, which was dead and quite dry, being carried off. At the time I presumed that this habit of catching fish was probably well known and I thought no more about the event until I returned to Cambridge and spoke to my entomological friends and searched the literature with small results.

I found that McCook, in his *American Spiders and their Spinning Work* (Vol. 1, 1889, p. 236, fig. 219), pictures an enormous spider riding on the back of a moribund and gigantic carp. If the relation of the size of the fish to that of the surrounding lily leaves is normal, the accompanying story of the unique event is too flamboyant to be in the least convincing. Comstock (Spider Book, 1912, p. 186) offers no original observations, but adds: "Several apparently well-authenticated instances of the destruction of small vertebrated animals, including birds, a mouse, a fish and a snake, by spiders that are much smaller than Avicularia, are given by McCook. But, of course, all such occurrences are exceptional." Avicularia is the great hairy so-called "bird-eating spider" of the tropics. The species I was watching I believe was *Dolomedes tenebrosus*. I presume that,

given conditions such as I have described, small fish may offer an easy and frequent prey for spiders with the habits of Dolomedes. Otherwise, the opportunity to secure such prey cannot be very frequent.

I presume that the long duration of dry weather produced a condition where many tiny fish, some dead and some dying, were held captive in little depressions in the mud of the shallows along the St. Johns River. Hence they were easily caught by the marauding spiders.

It was a curious experience to see the Dolomedes scurrying about, carrying a prey which seemed so wholly foreign to their normal habits. I do not dare say how frequently I have looked to see whether I might see these events re-enacted. I never have seen them again, although I have revisited Lake Washington and the St. Johns River on numberless occasions. Probably the same conditions were never exactly reproduced.

CHAPTER XIII

Alligators and Crocodiles

SOMETHING has happened to the alligators and crocodiles of Florida. Early travelers feared them, for they apparently hunted in packs and were fearless, really terrifying animals. Today they are not only pitifully reduced in numbers, but they are craven beasts, seldom seen by day. Their nature appears to have changed.

First and foremost let me say that the names "alligator" and "crocodile" are not interchangeable. They belong to two very different sorts of animals. Generally speaking, alligators, of which there are only two species, one in the southeasternmost part of the United States and the other in China, are heavy-bodied animals having flat snouts with rounded ends; they are always dark-colored, the common Florida species being black with yellow markings. Crocodiles are grayish or greenish, much more slender than alligators, and have sharp, generally pointed snouts. There are many species, which are found in most of the tropical parts of the world. The rumor that the crocodile's upper jaw is movable, and that the beast differs in this way from the alligator, is nonsense. The principal differences by which the two are separated by naturalists are anatomical and too technical to detail here.

Dr. Jeffries Wyman was the original discoverer of the

crocodile in Florida. Crocodiles had been reported earlier, but the one Dr. Wyman identified was taken from the Miami River at the point where it enters Bay Biscayne – where Miami is now.

Many years ago the crocodiles were much more abundant than in our day; in some open bodies of water in the mangrove forests over where Miami Beach is now, they positively swarmed. One of these crocodile holes was in the confines of Hallandale; another was right behind the present location of the St. Francis Hospital.

When Commodore Ralph Middleton Munroe wrote his story in 1930, he had the following to say regarding crocodiles in Florida: –

> I had promised Dr. J. B. Holder of the American Museum of Natural History in New York to keep an eye open for his interests, and hearing reports of a large crocodile up the Bay, we went to investigate.
>
> We had only recently realized [1886] that the brackish waters of this part of the coast harbored real crocodiles, quite distinct from the alligators, who confine themselves to the fresh water. In fact, the two keep strictly to their own bailiwicks, usually fighting savagely if they chance to meet.
>
> We found his lordship in Arch Creek, a short distance from its mouth, sunning himself on the south bank, and made several vain attempts to net him. Finally I got the grains into his neck and he went to the bottom in eight feet of water, with his

head under a ledge. We got two other lines around his tail, bent over a large sapling, made the lines fast to it, and left him for the night.

Next morning he had tired of holding against the strain and was out on clear bottom. Another line was slipped over his head, and then, taking turns around the fore and main masts of the *Kingfish*, we began heaving in. That fool reptile, with strength and jaws able to tear the little boat into kindling wood, never did a thing until we had him too short alongside to get a lick at us, and then something was doing every minute for the next half-hour, until he was exhausted. Rolling up the lines, he would almost capsize the sharpie, while Charley Peacock and I climbed out on the other side. Then, finding that his teeth were gouging chunks out of her cedar planking, I got a rope-yarn slip-noose ready, and watching for a chance, got it around his jaws. This seemed to discourage him and he lay quiet.

So we had him alive; but what should we do with him? Had we known that there was a buyer in New York ready to give thousands for one of his size, 14 feet 8 inches, we would soon have had him in a crate and on the way. But thinking of the Museum, and a previous experience when an eight-foot crocodile, supposedly dead, had come to life in a twelve-foot skiff, and came within an ace of throwing three of us overboard in a crocodile-hole where I had seen twenty at once, we finally concluded that the only

good crocodile was a dead one. So we ended his career with a rifle-ball and after much rigging of purchases got him aboard. He weighed close to 1,200 pounds.

But while crocodiles are rare they are by no means all gone, and my brother Robert, who lives at Golden Beach, just north of Miami Beach, and whose place backs up against an inland waterway, went down to his dock one day and saw a crocodile in the water right at his feet. The water was clear and he could see every scale on the monster, which he assures me has been seen on many occasions during the last five or six years. It is called Moby Dick by his neighbors, and he believes that the animal is at least twelve feet long.

That means that crocodiles in Florida years ago grew to be larger than alligators, at least in this part of the state. The crocodiles occupy only a small area in the upper Keys and around the coast of the southeastern section of the state, but at one time they extended as far north as the Indian River – though they were extremely rare. Their extermination has been due partly to hide-hunting and partly to their capture for sales to zoological gardens and menageries. The eggs are often gathered and hatched artificially, but the tiny hatchlings are vicious the moment they emerge from the egg, and never get tame as little alligators do.

Since crocodiles in Florida are strictly nocturnal at the present time, there are probably far more of them

scattered about in the Keys than most people suspect. But if I wanted to find a crocodile tomorrow, I should in no wise be sure of having my wish granted.

In many parts of the world, crocodiles are still greatly feared by man. A number of those that I shot in the delta of the Ganges had bangles and bracelets in their stomachs. The ornaments may have come from corpses floating down river. Many Hindus are too poor to afford the wood necessary for complete cremation, and throw the remains into the river. In the Ganges delta, and in the lower reaches of the river near the Bay of Bengal, one constantly sees corpses floating by, usually ridden by a crow or two. They are picked at as well by the great soft-shelled turtles, and no doubt frequently consumed by crocodiles. But it is also certain that crocodiles lurk near the places where women come to dip up water, and near fords where men must cross streams.

The American species of crocodile has never been so belligerent as some of the Oriental forms, and today the beasts that are found in Florida around the southern tip of the peninsula and among the Keys are, as I have indicated, so shy and retiring that many people scarcely know of their existence.

To show what the alligator once was, I shall quote from William Bartram's *Travels*, the best contemporary source. We must remember that Bartram uses the words "crocodile" and "alligator" interchangeably. He records: —

Courtesy of Worth Monroe

The old crocodile hole, Indian Creek, Miami Beach, about 1885.
Near the present site of St. Francis Hospital
pre,

> The noise of the crocodiles kept me awake the greater part of the night; but when I arose in the morning, contrary to my expectations, there was perfect peace; very few of them to be seen, and those were asleep on the shore. Yet I was not able to suppress my fears and apprehensions of being attacked by them in future; and indeed yesterday's combat with them, notwithstanding I came off in a manner victorious, or at least made a safe retreat, had left sufficient impression on my mind to damp my courage; and it seemed too much for one of my strength, being alone in a very small boat, to encounter such collected danger.

The prospect of "running the gauntlet" farther up the river, Bartram says, was almost more than he could contemplate. But he resolved to continue his journey for one day more. He goes on: —

> Accordingly I got everything on board, charged my gun, and set sail, cautiously, along shore. As I passed by Battle lagoon, I began to tremble and keep a good look-out; when suddenly a huge alligator rushed out of the reeds, and with a tremendous roar came up, and darted as swift as an arrow under my boat, emerging upright on my lee quarter, with open jaws, and belching water and smoke that fell upon me like rain in a hurricane. I laid soundly about his head with my club, and beat him off; and after plunging and darting about my boat, he went

off on a straight line through the water, seemingly with the rapidity of lightning, and entered the cape of the lagoon.

Bartram proceeded, but he adds with good reason that he "could not forbear looking now and then behind me." And sure enough, he soon spotted another one coming up: —

> The water of the river hereabouts was shoal and very clear; the monster came up with the usual roar and menaces, and passed close by the side of my boat, when I could distinctly see a young brood of alligators, to the number of one hundred or more, following after her in a long train. They kept close together in a column, without straggling off to the one side or the other; the young appeared to be of an equal size, about fifteen inches in length, almost black, with pale yellow transverse waved clouds or blotches, much like rattlesnakes in colour. I now lost sight of my enemy again. . . .
>
> The alligator when full grown is a very large and terrible creature, and of prodigious strength, activity and swiftness in the water. I have seen them twenty feet in length, and some are supposed to be twenty-two or twenty-three feet. Their body is as large as that of a horse; their shape exactly resembles that of a lizard, except their tail, which is flat or cuneiform, being compressed on each side, and gradually diminishing from the abdomen to the

extremity, which, with the whole body, is covered with horny plates or squamae, impenetrable when on the body of the live animal, even to a rifle ball, except about their head and just behind their fore-legs or arms, where it is said they are only vulnerable. The head of a full grown one is about three feet, and the mouth opens nearly the same length; their eyes are small in proportion, and seem sunk deep in the head, by means of the prominency of the brows; the nostrils are large, inflated and prominent on the top, so that the head in the water resembles, at a distance, a great chunk of wood floating about.

Bartram took a particular interest in the jaws of the creature: —

In the forepart of the upper jaw, on each side, just under the nostrils, are two very large, thick, strong teeth or tusks, not very sharp, but rather the shape of a cone: these are as white as the finest polished ivory, and are not covered by any skin or lips, and always in sight, which gives the creature a frightful appearance: in the lower jaw are holes opposite to these teeth, to receive them: when they clap their jaws together it causes a surprising noise, like that which is made by forcing a heavy plank with violence upon the ground, and may be heard at a great distance.

But what is yet more surprising to a stranger, is the incredible loud and terrifying roar, which they

> are capable of making, especially in the spring season, their breeding time. It most resembles very heavy distant thunder, not only shaking the air and waters, but causing the earth to tremble; and when hundreds and thousands are roaring at the same time, you can scarcely be persuaded but that the whole globe is violently and dangerously agitated.

You will note that Bartram speaks of alligators of a far larger size than anything which we know today. I have seen a specimen thirteen feet long in captivity, and the Agassiz Museum has a skull from an individual that was thirteen and a half feet long – the largest in my experience. This large alligator was shot by H. C. Eyer in the Sebastian River in 1888. Eyer was a taxidermist who lived at Rockledge, sixteen miles north of Eau Gallie. I saw this skull first ten years after he had shot the animal, and tried hard to procure it for my collection. Mr. Eyer declined to part with it. I pestered him from time to time and then completely lost track of him when he moved north. Then, to my delight, in 1923 he wrote me that he was giving me the skull.

There is, however, no reason to conclude that Bartram exaggerated. Consider this parallel: Paul de la Gironière tells what is certainly a true story in his *Twenty Years in the Philippine Islands* (Harper & Brothers, 1854); he describes how in 1825 he, with Mr. George R. Russell of Boston, killed a giant crocodile,

a fearful creature that for years had taken a heavy toll of human lives near a much-used ford in a stream near Lake Taal in Luzon. The crocodile was twenty-seven feet long and eleven feet around the body behind the forelimbs. Simple mathematical computation, and careful comparison with the skulls of other crocodiles of which we have complete skeletons, and hence know the exact length, prove that this animal must indeed have been nearly thirty feet long. This skull was brought home by Mr. Russell. I have it now here in the Agassiz Museum. It pleases me that today what I believe to be the largest alligator skull in the world is on exhibition beside what I know to be the largest crocodile skull.

No such crocodile exists today anywhere in the Orient; hence there is no reason to doubt that Bartram, writing years before the killing of our Philippine monster, encountered alligators quite as large and quite as ferocious as those he described.

As a boy I was thrilled to hear the gators bellow in spring in the St. Johns River marsh at Lake Washington, one of the great centers of gator hunting. They were abundant then. In recent years I have gone to the "Cabbage Mound" at evening and listened, and have never heard more than a few scattered animals calling. One used to hear a chorus.

At Gainesville, on Bivins Arm, my friends the Dickinsons have a house right on the south shore of this sanctuary. Here the gators have been protected for years,

and Lucy Dickinson, who is alone there at night with her small son, her husband being in the Navy, tells me that on occasion the ground fairly trembles with her saurian neighbors' bellowing. I went out on several evenings to hear what I could hear. A northwest breeze sprang up, the air cooled, but all was silent. There are few places left in all of Florida where a real gator chorus can still be heard.

Most people do not know that alligators may be "called." Of course old reptiles which have been chivied or shot at are shy, but little gators, and big gators in wild, remote localities, where they have had little to do with man, come to the grunt, sometimes repeatedly. The call is made by holding your nose and croaking rather like a frog. The sound is indescribable but is not at all difficult to imitate.

One of the most characteristic features of Florida is the needle-grass pond of the open piney-woods prairie. These are the special haunt of the sand-hill crane, for it is in the middle of one of these ponds that it builds its nest, where the water is perhaps a foot deep, and here it raises its young. These little bodies of water all have a hard bottom and one may wade there at will.

If you will look every one of these pools over carefully, you will see perhaps two or three tufts of vegetation sticking up above the level of the grass and rushes, which differ markedly from anything else to be seen. These little patches will consist of Pontederia, spatterdock, and blue pickerel weed. They mark gator dens,

and I imagine that they are very, very old. The gator scoops out a hole of some considerable depth and in one side of this hole he forms his cave, a refuge where he may retire for rest by day or during cold weather. Detritus and probably the excrement of the alligator in time give a different character to the soil at the bottom of the hole, so that these special plants gradually come to grow there.

The old-time crackers, who love to hunt gators in these prairie ponds, take an iron rod about the size of your little finger, sharpened at one end, and, as they say, "proag" down a foot or two back from the pickerel weeds in the sand. As soon as they touch the gator they can feel him move about, and usually he will grab the iron rod with his teeth. Then the gator hook is brought into play. This is a hook, two to three inches across, which does not need to be sharp, on a long pole.

After a good deal of feeling around, one can work this hook down into the gator's burrow until he grabs it. Then with a steady pull he can be drawn out, for he leads easily when the hook is set behind the symphysis of his lower jaws. Now walk him straight ashore while the surprise period lasts. Disengage the hook and grab his bill. The muscles for opening his jaws are very weak, and if you act quickly he still will be surprised and unresistant and you can put a noose around his bill and make it fast around his neck. Hurry then, or have an efficient helper, and you can get his forelegs and hind legs and hitch them together over his back before he begins to thrash about. Sometimes they never do thrash about, but some-

times they are hard to handle until you make them fast to a pole.

Frank Carlisle, who taught me all I know about gator hunting, went out with me one day after we had promised to get three good-sized gators to put in the pond in the lawn of the Miami Aquarium, which had just been opened at Miami Beach. Mr. John Harris, a friend of my father, asked to go along – and we set out to visit some ponds inland from Lake Worth, where we had seen signs that gators had been walking around on the sandy shores. We finally got a gator about seven feet long, tied him up, and put him in the back of my beach wagon, from which the rear seat had been removed. We drove around to a number of other ponds, where we found that the gators were not at home, and we decided the time had come to boil a pot of grits and get dinner.

I stopped the car at a likely-looking shady spot where there was some dry wood, and Frank jumped out of the car and walked around to get the cooking gear, which was all nested together in a very compact and convenient container. By some hook or crook, that gator had managed to get rid of his bridle, and as Frank was reaching into the back of the car the gator made a snap. I can hear now the way his jaws chugged as they met together on Frank's elbow.

Now Frank was an old hand in the woods and he kept his head. He knew that if that gator began to whirl, it would wring his arm off in a jiffy. He always called me

Dad. He said, "Dad, step in the back of the car as quick as you can." I did. I had sneakers on my bare feet and was able to get a good hold with my toes on the sides of the alligator's jaws and then, gripping the tip of his snout with both hands, I pulled the jaws apart. Frank got clear.

The question then was how in the devil I was going to rid myself of the gator. But the sand was soft and I just let go everything and threw myself on my side on the ground beside the car. I then took the gator hook, pulled the gator clear of the car, and shot him behind the front leg with a charge of bird shot. We left him right there, picked up our gear, and drove as fast as a crooked sand road would allow to a drugstore in Lake Worth. There were two lines of holes made by the gator's teeth across Frank's forearm near the elbow and two on his upper arm. The druggist, with a toothpick with cotton wrapped about its tip, pushed iodine down into each hole. The iodine did the business and no infection set in.

Subsequently we took a gator home and made it fast to a tree in the yard, for we wanted two more before we started for Miami. We got them in due season and took them to the Aquarium, although one gator, while we had him awaiting the journey, almost played some mischief, for he had scope enough to his rope to get in close to the hedge which surrounded our place at Palm Beach. He evidently wanted shade. At any rate, he was almost jumped on by our paper boy, who took a short cut and leaped over the hedge with no idea that he would almost

land on a good-sized gator. He was terrified, but the gator was bridled and I don't think he actually hit the boy, though he could thrash around with his tail pretty nimbly.

We got a piano box, took both back seats out of the truck, and drove the three reptiles in the box down to the Miami Aquarium and turned them loose in the pool. They had managed to do considerable damage to each other in the course of the trip, as they didn't like the joggling of the car. Gators, however, have rapidly healing flesh; and so far as I know, they lived in their new home until the Aquarium was sold out and abandoned.

Of course this method of catching alligators is not the one employed by the commercial gator hunters. It is the method used in securing live animals to supply the number of alligator farms to which admission is paid by the winter visitors and from which zoological parks, circuses, and other institutions are supplied with live animals.

Commercial gator hunting is carried on entirely at night. In times of high water the hunters push their long, narrow, and, I may add, very light and ticklish skiffs through the bonnet beds and around the edges of the lakes and through the pools of open water in the big marshes. The gator's eyes are "shined" with a headlight and the animal is shot, sometimes to be killed outright, and more often stunned with a charge of heavy shot. Then it is drawn to the surface with a gator hook and dispatched, either with a long-handled hatchet or with a heavy machete.

Gators from four to seven feet long furnish the highest-priced hides, but much smaller ones are also killed, their skins making pocketbooks, cigarette cases, and similar novelties. Many of the old giants were killed either for sheer deviltry or because they were supposed to be destructive of younger and hence more valuable gators — for by common repute they are cannibals. If there was a convenient tussock or mound of high land at hand to which the gators could be hauled and piled up during the night, so that repeated trips could be made, the number of animals killed in a single night's hunt was sometimes very large indeed. This killing, carried on year after year all over the state, has made the reptiles rare and they are now relatively seldom seen.

To be sure, there are enough in the various so-called alligator farms to repopulate the state if there were money available to buy them up and turn them loose. I believe there is still enough seed left to ensure that the animal will not become extinct. The slaughter still continues even though gator hunting is prohibited in certain counties of the state. For the moment, at least, the scarcity and the high cost of ammunition are giving the animals a welcome respite. I am informed, however, that at the Gainesville hide brokerage about 80,000 skins are received each year. But the more gators are hunted, the more shy and secretive they become, and it is almost impossible to conceive of the possibility that in a big marsh every last animal could be killed.

CHAPTER XIV

The Islands and the Keys

FLORIDA is a state fringed with islands. From Anastasia Island up near St. Augustine in the northeastern corner, around to Santa Rosa at Pensacola on the Gulf Coast, the peninsula is beset with them in incredible variety and number. Anastasia Island is famous among naturalists as the home of a little, pallid wraith of a beach mouse, found nowhere else in the world, and Santa Rosa is celebrated for its beautiful beach and for its heaths, which are so exquisite in the spring.

Captiva and Sanibel, islands off the West Coast, are world-famous for their sea shells. A little farther south, Marco Island is covered with the most enormous mounds that I know of anywhere. In the southwest corner of the state is that great labyrinth known as the Ten Thousand Islands, a fascinating maze of flat mangrove keys, barely above sea water. The little keys are inhabited by myriad coons, a few panthers, and a few deer, and are conspicuous as the nesting grounds of pelicans, cormorants, herons, and ibis. These rookeries are spectacular sights, and well worth a somewhat difficult journey.

The Ten Thousand Islands are famous, too, for the size and profusion of their mangroves. I have traveled in

many parts of the world where mangrove trees are to be found, and never have I seen mangrove forests so high and impressive as those in the vicinity of Shark River. The fishing in the passes amongst these mangrove keys is excellent, but how the fishermen from the old settlement of Chuckaloskee find their way so unerringly through the miles of passages where all shores look exactly alike is a wonder to me. This is an ideal region for a houseboat trip, for the birds are a constant joy to behold, there are plenty of fresh fish, and good oysters may be found on many of the bars at low tide.

There are islands on the East Coast of Florida, too; Merritt's Island in the Indian River, which, since it is entirely surrounded by warm water, has been planted with some of the finest citrus groves in the state, and is fertile and picturesque. But when most people think of the islands of Florida, they really think of "the Keys."

A great friend of mine wrote me recently: "I first saw Florida from the porthole of a yacht in Key West harbor in 1888 and I have never liked it since." I can believe Key West was a sorry little town at that early date but I venture to say that if my friend had gone ashore and fallen into the right hands he would have had a very enjoyable time. For Key West has a spirit and a distinctive atmosphere; more than that, it is one of those rare places in the United States which, like Charleston or New Orleans, has produced cuisine with traditions all its own.

Who would not bless the kindly soul who first introduced him to a perfectly prepared "Hopping John"? This, if you don't happen to know it, is a richly flavored mess, made preferably of pigeon peas or cow peas, cooked up with rice and bits of white bacon. Have you ever tasted a baked turtle as the dish is served at Key West? You begin with a young green turtle; the savory meat is diced and mixed with cut-up "calipash" and "calipee" (the fat and the lean), preferably with plenty of turtle eggs mixed in; the delicious mixture is put back in the animal's shell, covered with piecrust, and baked in a hot oven. Since Key West has always been a half-Cuban town, many of the savory creole dishes handed down from Old Spain add their spice to the table. The queer little unpainted houses, many of them said to have been brought from the Bahamas, with their typical West Indian jealousy blinds, and the tales of old wrecking days, make this town to me a center of real charm.

During the last war I served the Government in a rather unimportant capacity in Cuba. The day the Armistice was signed I crossed over to Key West with some mail. After my package was accepted by the postal clerk, I engaged a horse and surrey with a driver who had piloted me on many other occasions. The Jehu said to me, "Well, Doc, the war is over. It's a damned shame. If it had only lasted two years longer it would have made a real city out of Key West." This was a silly remark, but it was a rather pathetic one. I had often talked with this man, and I do not believe that any

Courtesy of D. Fairchild

A mangrove swamp along the shore

Courtesy of D. Fairchild

The interior of a mangrove swamp

cabinet officer ever showed off the beauties of Washington to a visiting foreign potentate with more pride than this fellow displayed when he pointed out to me the new post office in Key West. It is a pleasure to see such provincial-mindedness when it carries real pride and contentment with it.

How different was the remark made to Sir Gilbert Carter when, as Governor of the Bahamas, he went for the first time to inspect one of the great new lighthouses erected by the British Board of Trade. It was either on Great Stirrup Cay or on Great Isaacs Cay – at any rate, the little handful of inhabitants, dressed in their Sunday best, lined up when His Excellency came ashore. After making a short speech he asked if there was anything special which he could do for them. The spokesman for the community promptly replied, "Yaass, Me Lard, pull that dahm lighthouse down. Hit shows light so far to sea ve vill starve to dath." The islanders had been living in relative opulence from the wreckage of ships which they had skillfully decoyed to destruction on the reefs, and well they knew the ins and outs of admiralty law concerning salvage. So it is all in the point of view.

The Key Westers are members of an industrious and hardworking community, hospitable to a degree. I know of no group of fishermen anywhere with a more completely detailed knowledge of more different kinds of fish. No wonder that the great aquariums in New York and Chicago used to rely on Key West to keep their

tanks filled with the gorgeous denizens of the reef. I frequently saw the specially equipped car of the Shedd Aquarium of Chicago on a siding near the Key West water front, before the Overseas Railway was washed away and Key West was left without rail connection with the mainland.

Key West was once the largest city in Florida. It prospered during the First World War and, with the coming of the railroad, prosperity continued; but by 1934 half the population, which amounted to about 11,500, was on relief. Then came the incredible hurricane of 1935 which swept away the railroad. A Federal Emergency Relief Administration took over the town, which was threatened with starvation, and started to work on a program to beautify the city, make known its attractions, and popularize it as a winter resort for those who enjoyed the simple life. This program bore fruit. Later a wonderful highway was built on the old railway trestles, water was piped down, and today, with the demands of another World War, a place to lay your head is as difficult to find in Key West as in Washington.

Several species of flowering frangipani grow better in Key West than I have ever seen them growing anywhere else in the world. There is no evidence that they are native to the Keys, although they abound in the Bahamas in a wild state. The plant is a low tree, perhaps twenty feet high, with a closely clustered head of heavy, thick, fleshy branches. If you break one, white sap

pours forth. The trees are brittle and do not stand the hurricanes at all well.

Frangipani leaves are large and rather handsomely veined. The flowers are borne in bunches on the end of each branch in a round, flat head, called a cyme by botanists. The blooms are waxy, and the petals are tilted slightly, so that one border of each petal is tucked under the edge of its neighbor. Some species are pure white, some white suffused with rose, others lemon yellow, others reddish, and one a purple, paler than royal purple, but with no taint of magenta. These flowers are exceptionally fragrant, and as the cymes carry an enormous number of buds, which keep opening in turn, the tree is in bloom for a very long time. Gorgeous examples of this tree grace some of the little dooryards in Key West, where one feels almost awestruck that so much beauty should stand in such a modest setting. But it is not a tawdry setting. The people who own the house may be poor, but they cherish their tree, and are proud of it as one possession which they can set forth boldly for the world to admire.

The flowering trees which we call collectively "frangipani" belong to the genus Plumeria. There are about fifty species of this genus, all found in the islands or on the mainland around the Caribbean Basin. Mexican species, probably carried from Acapulco to Manila, were early established in the Philippines, and today, Plumeria trees grow in every Mohammedan cemetery from southern India and Ceylon east to the Moluccas. The

flowers are sometimes called the Malay flowers of the dead. Everyone in the East believes that the trees are native to that particular region, just as pretty much everyone in South Carolina thinks of the Cherokee rose as native.

It occurred to me that there is one person who would know whether I am right in guessing that Plumeria reached the Orient from Mexico: E. D. Merrill, who has delved deeply into the lore of Oriental plants. I asked him and he replied that Plumeria was introduced into Manila by the Spaniards in the sixteenth or early seventeenth century. In the Philippines it was widely known as *Kalachuche*. Merrill records variants of this name – all, he concludes, modifications of the ancient Nahuatl name *Kalachuchl*, which was introduced from Mexico along with the plant itself.

The best account of the Keys with which I am acquainted is in Charles Torrey Simpson's *In Lower Florida Wilds*. Simpson, whom I knew well and will long remember, was not really a scientist, but he was thoroughly endued with the spirit of poetry, was full of sentiment, and was a first-class plantsman. He exerted an extraordinarily beneficent influence on the lower Florida community and has left a treasured memory behind him. I am not going to attempt to recapitulate all that he said about the Keys. I can strongly recommend the reading of his book, but I think this reservation is worth making: In connection with the formation and dissection of

these islands, Simpson frequently postulates an "uplifting" of the land. I believe that it is much more likely that what happened was a lowering of the surface of the sea. To be sure, the result may have been the same. Nevertheless, as I see it, each time the earth passed through one of the several epochs of extensive glaciation there was such an enormous amount of water tied up in the gigantic polar icecap that the surface of the sea was lowered. Just how much it was lowered varies with the authority who makes the estimate, but even the minimum established would mean extensive connections between all the present islands around Florida and the mainland.

There is a curious and fundamental difference between the Upper and the Lower Keys. Glance at a map and you will see that the Upper Keys are strung in a long, irregular line, beginning just below Miami and extending southward to the Bahia Honda Channel. These keys have many plants peculiar to them, and one beautiful snake not found elsewhere. Although there is a little hammock standing on Key Largo, the largest of the whole group, most of that island has been cut off and planted to limes. The other keys, especially Matacumbe and Long Key, suffered terribly in the hurricane of 1935. Indeed some areas were almost swept clean and while the vegetation is slowly growing up again, the evidence of devastation is still sad to see after almost ten years.

The Lower Keys give every evidence of having once been an island of considerable size. In general, they lie

across the axis of the other keys, and it seems not unlikely that the channels between them have been formed, in part at least, by tide rips and swift currents of sea water. No pine trees grow in the Upper Keys but there are pines on Big and Little Pine Key and on a bit of No Name Key as well. Here the Florida pigmy deer is to be found, at last protected by a special state law, and apparently increasing slightly in population. There is a peculiar cotton rat confined to these keys, and they are extensively, though not exclusively, frequented by the great white herons.

The Lower Keys have many peculiar plants of West Indian origin, a considerable number of which are not found either on the Upper Keys or on the mainland. Generally speaking, they did not suffer in the devastation which struck the Upper Keys in 1935. They have been visited by hurricanes since time immemorial, but no such heavy blow has left its impact on the Lower Keys in many years. Here there are fine mangrove forests and an excellent opportunity to see all stages of key formation, from the first little tuft of green resulting from the germination of one of the curiously weighted mangrove fruits, to groups of these trees of considerable size, which are beginning to accumulate detritus and so to build themselves up to form a new island.

I know of but one island which is almost without vegetation, and that is Sand Key below Key West. This is the southernmost point of the United States. A few strand plants of the goat foot Ipomoea and two or three

other such species grow there, but evidently the key shifts about too much for permanent vegetation to get a hold.

The Keys have a great fascination for me. Drive down through the islands on a bright sunny day, and you will find the colors of the water fantastically lovely, as fine as anything of the sort to be seen anywhere. I remember once driving from Miami to Key West in midsummer, when we found that our motor was overheating rapidly and wondered what on earth could be the matter, since it had been filled with water just before we started on our journey. Stopping our car and walking around to see what we could see, we found that the whole radiator was clogged by an extraordinary variety of butterflies. We had noticed the tremendous number of these insects flying about but had not realized that their abundance was so great as actually to choke the fresh air intake of a motor.

CHAPTER XV

The Kampong

DAVID FAIRCHILD, for years Chief Agricultural Explorer for the Department of Agriculture, is the most romantic figure I have ever known. Thousands of people know of David from reading *Exploring for Plants* and *The World Was My Garden;* thousands more are indebted to him every day of their lives for the foods with which he has enriched this country. This is no exaggeration, for his durum wheat makes our daily bread.

David's life has been a combination of triumphs and disappointments. Triumphs came, among other reasons, because of his discoveries as an explorer of plants — because that very durum wheat crop I have mentioned is now worth perhaps fifty million dollars a year. The Japanese rices, which he introduced, represent another five million. Sudan grass is now a fifteen-million-dollar crop, and the feterita sorghum, which he brought from Egypt to our Southwest, has grown to the worth of several millions of dollars. The same is true of Peruvian hairy alfalfa. He has been instrumental in the introduction of the numberless varieties of soy beans; varieties derived from these by hybridization in this country now

promise to become among the most important of all American crops. David and I both enjoy acidophilus soy bean milk. As for the plastics made from the same bean, they are essential to the airplanes of today and serve a hundred other uses.

It is impossible to tell David's accomplishments in brief: he did wonders with sugar cane; with the innumerable bamboos, edible and ornamental; with the Chinese jujubes and persimmons, with tung oil, with the Japanese flowering cherries, and the Chinese cabbage; also with the Dasheen, one of the elephant ears, which has an edible root better flavored than any potato. He has applied his skill to the introduction of the papaya, also of the Sarawak bean and the Yam bean; he has introduced such fruits as the Quetta nectarines which are grown so extensively in California today, and a list of dates, mangoes, persimmons, and alligator pears as long as my arm.

Why then should he be disappointed? David's disappointments come from the fact that the American people are the most conservative, unchanging, and completely disinclined to gastronomic adventure of any people in the entire world except, I suspect, the Irish.

Every traveler has had this brought home to him. I shoot dear and elk each autumn, and the meat which I bring back is about as welcome at home as rattlesnake meat would be. Some members of my family will not eat veal, I think entirely because it is light in color. They will not eat tripe. "Oh, I wouldn't taste that, it is so dis-

gusting-looking." "Who would eat an eel? It looks like a snake." (Think of the jellied eels of Denmark and Germany in the days past!) "I don't like the consistency of sweetbreads. Besides, they're innards." All heads – calves, pork, or sheep – are eschewed, and exploratory taste is not attempted, because of appearance. And so it goes on, even rice being disliked by one, chicken livers by another, or pork, or kidneys, or indeed pretty much everything except the good old Anglo-Saxon stand-bys of lamb, mutton, ham, and domestic poultry. David has had this same experience multiplied many times. Now he finds the public learning – very, very slowly, but finally learning – that some of his fruits, say the best of the mangoes, and such alligator pears as the Trapp and the Lula, are really something to rave over. I think the thing which David and I, and Marian too, really enjoy most about our visits together is the fact that all three of us are adventurous feeders and will take a chance on anything, from the fat, white grubs which are the larvae of the pestiferous weevils that bore into palm trees, to conch croquettes.

The story of David Fairchild's coming to Florida and of his activities there has been well told in his own books. But he has never described his home, so well known as "the Kampong." *Kampong* is a Malay word meaning "a little village or cluster of houses enclosed by a wall." His place is a strip of about eight acres, running from the shore of Bay Biscayne to the Ingraham Highway in the only old community in southeastern Florida, one which

for a long time has attracted writers, scientists, and men of affairs who love the quiet life. Kirk Munroe, Dr. L. H. Baekeland, Arthur Curtiss James, W. J. Matheson, and David himself are representative examples. While many of his neighbors have built formal gardens, David and Marian Fairchild have let their precincts grow up very informally; there must be a hundred different named types of fruit within the confines of the Kampong. The house looks out over the Bay, where in the foreground royal palms, coconut palms, and a noble native pine rise from a mat of untouched vegetation extending from the terrace to the mangroves fringing the shore.

The house is a rambling one, with an outdoor dining room and an open porch on one side. Separating the victualing part of the house from the rest is an arch, serving for what in Florida is called "the breeze-way." When the great doors are thrown open and one sees through the house as one comes up the drive, the view framed by that arch makes every newcomer pause to drink in its beauty.

The old, original house stands near by, silvery gray, of Dade County pine. No timber of that house has ever yet been bored by a termite. Where would you get such wood today?

Farther down, in a bower of jasmine vines beside a Wampee tree, is another little wooden building which was once used as a music room by the Fairchilds' daughter Nancy Bell, before she married and went to live in Albania, and then in Egypt, and now in Colombia, where

her husband is making far-reaching discoveries concerning the etiology of yellow fever for the Rockefeller Foundation.

South of this little house, called "the Wamperi," is a small bit of woodland, a cluster of old live oaks, their branches laden with native orchids and bromeliads. Here Roxburgh's strange fig from the Himalayas, shade-loving palms from the Philippines and Guatemala, and Heaven knows what else, grow happily. This section is called "the Hammock."

Next to the Hammock stands one of the oldest buildings in all southern Florida – a potting shed below, and upstairs David's study, his library, his microscopes, his collection of photographs, and a little of everything else. If I were to attempt a superficial catalogue thereof, it would mean writing another volume. The great window of David's study is, I think, more than twenty feet long and looks directly into the branches of a live oak. Right where he could touch them if it were not for the glass are the flowering orchids, the migrating warblers, the squirrels, and the little squabbling lizards who seize one another with their puny jaws, fall to the leaves on the ground, scamper about, and then climb the tree to do it all over again.

I hope David won't mind my seeming to intrude, in this way, upon his privacy. Heaven knows I have done it often enough before *in propria persona,* and half the population of the inhabited globe has done the same thing. I believe he has more visitors than any other living human

Courtesy of Lt. J. C. Dickerson

The Fairchilds and the Barbours
in front of the author's house in the Kampong

being whom I have ever known. Moreover, I can quite understand why; so also can Marian.

The little house in the Kampong, where I stay, consists of a room, bath, and a porch glassed-in around two of its sides, with sliding plates on the north and the east. The extreme end of the long north side is set off as a kitchenette, and the balance is occupied by a table and some chairs. It is a pleasant place to sit in the morning when the sun is hot across the east end of the building. The house is level with the ground, the windows look straight into the shrubbery, and the fit of the front door permits some of my small reptilian neighbors to pass in and out at will.

There are a pair of very pretty, brilliantly shiny, striped skink lizards which visit me almost every day. They pick up the odd pill bugs or isopods that are spurned by my giant house spiders, so they serve quite a useful purpose. About half-past eight, a beam of light comes through the huge hibiscus bush which shades part of the porch. It comes to rest right in the middle of the seat of a big armchair, and when these two little scoundrels have finished their morning foraging they frequently creep up and curl up, side by side, in that spot of sunlight. These skink lizards can't climb, but they police up the concrete floors and the cracks in the masonry where the walls and floors join. "Chameleons" creep all over the place, too, but are not so intelligent as the skinks at finding their way in and out.

The big house spiders are my especial pets. There is

not a chance for a cockroach or a water bug to step inside the premises; one of them would have him in a jiffy. I love to see their eyes shine like tiny emeralds when I turn on the light to go to bed. The other morning before daylight, I stepped out to see what the weather prospects were and felt something cool under my bare toes. I had pinched a little ring-necked snake, the most beautiful species in this part of the world to my way of thinking. The back of this little reptile is gun-metal blue, with a narrow golden ring about its neck. The belly is golden yellow with black markings prettily and symmetrically arranged. This snake is not only harmless but completely noncombatant.

Last year I found on my wall a green snake of the southern variety, with the keeled scales — it was all of forty inches long. This species is a clear, brilliant grass-green, almost lighter than the green of the young cypress shoots when they first come out. This critter was slender but so unusually long that I saved him for the Museum. I took hold of him as he was creeping up the rock wall of the house just inside the front door as I went to open it. He was decidedly incensed; opened his mouth, partly in terror and partly in anger — and the inside of his mouth and throat was a most lovely rosy pink.

Only a week ago I was sitting in the little eastern porch which serves me as library and writing room when a large blacksnake emerged from beneath the house. I could see that he had something in his mouth, and in a second it was obvious that it was a mouse or young rat.

The snake moved out about eight feet to where there is a little patch of open grass and then proceeded to make a most inept and inefficient display of mouse-eating. Why blacksnakes have not learned to coil about their prey, hold it conveniently, and kill it promptly, the way the constricting snakes in this region do, is a wonder to me. I suppose their musculature and backbone are conditioned and specialized for high-speed locomotion. The constrictors are slow movers. This snake used much clumsy effort in pressing the mouse against a stone with a section of its body and working it around for a long time until finally the victim was held nose-on in its jaws. When, at long last, it had the mouse held just as it wished it to be, the snake slipped it down as easily as a child, trying to be funny, will suck in a piece of macaroni.

The motor traffic not far away, gardeners at work on the place, and the fact that there are a good many red-shouldered hawks in the neighborhood, all mean that I have fewer opportunities to watch reptiles than I could wish. However, it pays to keep your eyes open and to be thankful for small favors. This I was the other day, when one of our neighbors was thoughtful enough to bring me, alive, a beautiful coral snake which he had taken in his mango grove near Homestead, about thirty miles south of here. It was an interesting find, because coral snakes are burrowers, rare down here where most of the land is solid rock. Moreover, this one was quite typical of the southern form, which by a curious coincidence bears the name of *Micrurus fulvius barbouri.*

One morning as I was at breakfast (I get up early and cook my own so as to have it just as daylight is coming and I can watch the sun rise across the bay from David's front porch) I saw, in addition to the usual pelicans, gulls, and grebes which frequent the mangrove inlet at the bottom of his front yard, a snowy egret perched in the mangrove and a pileated woodpecker on the pine tree directly before me. The only white pelican which I have ever seen in this neighborhood flew by just as I sat down to breakfast.

It is hard to describe a place so that another person can visualize it, but I am going to try. Behind my house there is a high stone wall which affords complete privacy in that direction. On the back stoop, outside my bathroom door, are my icebox and an outdoor shower. While standing under the shower, I can reach out and pick a delicious loquat plum from a tree shading the southeastern corner of the house. In front of the house there is a tiny cleared lawn, with space for a table and a few chairs, where David and I often meet to spin yarns when the day is done and it is not quite time to go to his house for supper. We are shut off from his driveway by a tangled mass of attractive vegetation: an old mulberry tree and a row of Murraya bushes eight or ten feet tall, a Garcinia, and a khat plant with metallic lustrous green leaves, overtopped by Ficus trees of several species.

Khat leaves are chewed by the Bedouins of southern Arabia in much the same way that Coca is chewed by

the Indians of high Peru and Bolivia. I haven't seen the Murraya in bloom. When I get there, the high shrubs are laden with tiny red berries; if you cut one through with your penknife, you see it is actually a minute orange. By April, every one of these will have disappeared – meanwhile the bushes are the scene of innumerable rows and bickerings as the mockingbirds squabble over which one has the right to pick fruit. The catbirds arrive in time to help gather the last of the crop. It is seldom that a single mulberry gets ripe enough for me to eat.

Just to the right of the doorway, scarcely fifteen feet away, is the only semblance of a boulder that I have ever seen in this vicinity. After you hit it with your shins a few times in the dark, you come to remember its position with perfect accuracy. It doesn't sit down very tight against the ground, and the two skink lizards who visit my house live beneath it. The little silver palms which surround it haven't grown an inch since David made the Kampong. They always look to me as if they were fashioned out of some flexible metal; the appearance of silver is very real, especially when the sun shines on them. Of course there are other palms scattered all about, including a beautiful specimen of *Adonidia Merrillii*, named for an old and valued mutual friend, Professor E. D. Merrill, the master of Oriental botany. This always seems to me the most stylish of all palms. There is a spruce, clean-cut look about its stiff, curved fronds. It bears the same relation to the Dictyosperma on the other side of my front door that a Shetland pony does to a little

hackney. There are coconut trees all about; the wind rustling their leaves at night often makes me think that it is raining, many times as I have heard the sound. The coconut is the queen of the palm world if grown where it is happy and where the soil is suitable; no specimen is ever unsightly and no two are ever alike.

Farther away are some spiny thickets composed of Carissa, pandans, and the like. They shelter black marsh rabbits during the day—at the moment four of the animals come out at evening and browse about. One of them has a special fondness for the occasional leaf which drops from a Ficus tree. Two are so tame that I may walk to within six feet of them before they hop away, and even then they don't go very far. Our rabbits are still out and about when I finish breakfast in the morning.

The Carissa clumps are shared by mockingbirds also, the great long spines giving just the protection which they favor for a nesting place. I wonder sometimes how much birds can see through glass or a mosquito screen, for as I sit at my desk, with the windows open and nothing but the screen between me and the giant hibiscus bush, the birds frequently sit quietly or scratch in the leaves on the ground beneath it, only a couple of feet from my chair. Have you noticed that ovenbirds scratch like a hen, while "jorees," or "chewinks," as we call them in the North, jump up and scratch, using both feet at the same time?

The thing I like about the hibiscus is that the giant blood-red flowers not only are individually superb, but

last just one day. Tomorrow there will be a new set of fresh blooms in a different setting. So there is eternal variety, day in and day out through the year. Hibiscus flowers are not especially favored by butterflies, but in sunny weather there are always a lot of insects bumbling about; giant metallic flies which drone noisily occur here in remarkable variety. Butterflies also are particularly numerous and are represented by a great many species, from the tiny little blues to an enormous black-and-yellow Papilio which I suspect is the largest species in North America. Then more than one Heliconius, velvety black striped with golden yellow, are always flitting about; they seldom come to rest, giving the appearance of being always on important errands.

I am not going to attempt more in the way of description. If I have not already sketched the outlines of a fairyland, I know that more mere verbiage will not help. I only wish that my reader might sit beside my front door with me in the shade of the afternoon and hear the great leaves from the Hooker's fig tree clatter as they fall to the ground – hear the mockingbirds sing, and the woodpeckers call to one another. Then he would understand why I hate to leave this spot.

CHAPTER XVI

The Fairchild Tropical Garden

THANKS to my warm friends Robert and Nell Montgomery, I have been allowed to take part in the development of a project which is very close to their hearts and, I may add, to mine as well. This has been the organization of the Fairchild Tropical Garden, a botanical garden to display to the public those plants which may be grown on the lime rock in the extreme southeastern corner of Florida. The Garden lies along the Old Cutler Road about eleven miles south of Miami, and adjoins the Matheson Hammock with its fine stand of the native flora. I have been asked several times, quite insistently, "But is this really a *tropical* garden?" The answer is yes; and I will tell you why.

The Tropic of Cancer, which girdles the earth 23½° north of the equator, is supposed to delimit the northern edge of the tropical zone. This line passes a few miles south of Key West. But since animals and plants do not know whether they are in Georgia or Florida, they are quite unaware of this human delimitation of the tropics. I am reminded that we have occasional frosts. That is entirely true, but there have been frosts in Mexico as far south of "the line of the tropics" as we are north.

From where I sit in the Kampong I am looking directly

at two coconut trees, both well favored and full of nuts. One tree is a tall stately individual of the ordinary *Cocos nucifera;* the other is a dwarf form, called "the Golden Coconut of Malaya." These strictly tropical trees are perfectly happy here. They would not be happy one hundred miles north under any circumstances. They cannot be grown in California, nor do I remember them in Lower California, which we visited once at some length on the now famed yacht *Utowana.* I once overheard Dr. Talcott Williams say to Professor William Morton Wheeler: "Where the coconut produces viable seed, there are the tropics – and where it is too dry for this to happen, I accept the date palm as my marker." I feel perfectly certain about the accuracy of the first statement, a little less sure about the second.

Here, when I look up over my shoulder, I can see a funny little crablike spider, the body beset with short, horny spines. This is either a Gasterocantha or an Acrosoma, probably the former. But that spider belongs to a group that spins its lovely, delicate, and yet extremely tough webs only throughout the tropical world. Since I started to write these lines he has rushed up and seized a gnat from which he is now sucking the juices, obviously in great delight. I have watched him for many hours from the chair beside my door where I am sitting, and have never seen him leave the center of his beautiful web before. He has sat there patiently for weeks on end. He is, so to speak, another coconut palm.

It is now five o'clock. If I wait until darkness comes,

I can walk to a live oak within 150 yards of where I sit and find roosting there on one bare branch all the Heliconius butterflies which live in this vicinity. They will assemble in a close cluster, and if the morning is cool they will not disperse until nearly an hour after sunup. These Heliconius butterflies have long, distinctly narrow wings. They fly swiftly, but have a queer fluttering manner of moving their wings which is characteristic of this group, and unlike other butterflies. I have seen them – perhaps not this same species, but certainly close allies – in Parque Vargas, in Port Limón, in Costa Rica, often on Barro Colorado Island in the Canal Zone, in Herbert Stabler's garden in Caracas, and during pleasant walks with Afranio do Amaral or Dr. Campos Porto in the botanical garden in Rio. This butterfly is another coconut palm.

We have several leaf butterflies here, really leaflike, with a stalk and all, when they fold their wings together. But are they stupid! They do not at all realize how perfectly they mimic a dead leaf. So instead of remaining rigid with wings closed when they alight on one of the bare branches of the mulberry tree, directly in front of my chair, they often flap their wings, showing the brilliant markings of the upper surface and making no use whatever of the elaborate dead-leaf likeness which the undersides of their wings present when folded together. Time and again in India I have seen Killima, the most famous leaflike butterfly in the world, do the same stupid thing. In fact, I have seen them all act in this way far

more often than I have seen them pose in the conventional position of all museum exhibits. These leaf butterflies also prove that our garden is tropical.

Last evening one of our four little rabbits came out of its lair under a thorny Carissa. The first thing it did was to run up and seek eagerly for a newly fallen leaf from an unidentified species of Ficus which David Fairchild brought from Celebes (an ultratropical region if there is one) a year or so ago, and which is thriving quite happily near my little screened writing room. It did not take the rabbit long to learn that this was good food. Moreover, directly in front of me is a thriving tree of *Ficus sycamorus*, the tree from which the mummy cases of ancient Egypt were made, and near it a lovely giant *Ficus Hookeri* from the Himalayas. The rabbits never pick up leaves of these trees, even though they are constantly falling. I hear them come clattering down, heavy leathery things, every few minutes during the long still nights of the dry winter season.

Yesterday morning at dawn David went out to look at a precious Rollinia onto which he had grafted another annonaceous plant, in other words a member of that family to which the soursop, sugar apple, bullock heart, cherimoya, and our own native pond-apple belong. On a twig and pressed closely to it was a rare and curious neuropteroid insect. This is a group which looks like the dragonflies, but even the amateur can tell it at once, for it has very long antennae and moves with a weak, ill-sustained, and confused flight. For some reason it always

looks to me like a miniature helicopter. Generally speaking, while the members of this order are widespread, they are all inconspicuous and very little known to the average observer of nature.

Now the member of this group which David found knew exactly how to behave in order to take advantage of its curious color and form. Its great long antennae were stretched straight before it, pressed closely to the bark of the twig; its four brown lacy wings were folded back behind it, and its body was thrust up at right angles to look like the stump of another tiny dried branch. While we were cooking our breakfast together, David told me about having seen this insect and remarked that he had blown upon it and it had dropped to the ground. After breakfast we went to the Rollinia and found that the insect had returned to exactly its original position. It has now taken a trip to Harvard College.

My colleague, Professor Nathan Banks, who knows the members of this group of insects probably better than anyone in the world, tells me that it is called *Ululodes floridanus*, but that it is not nearly so wise a little beast as I have depicted it to be, for on one occasion he found one posing, in its endeavor to appear like a little stump of a branch, on a clothesline; and again on a fence wire.

We also have a lovely Mantis, flattened and barklike: a perfect mimic. This is *Gonotista grisea*. To be sure, we have no such enormous variety of these characteristically tropical insects as are found in the torrid region

of the Old World, where they are of the utmost diversity of form and color, and many are extraordinarily beautiful. I could go on piling up more and more examples to prove my point, but I think any fair-minded person will agree that I have made it clear that the Fairchild Tropical Garden is not misnamed.

You will wonder what it is like. You must remember this is not, and is never going to be, any rival to the gardens in Buitenzorg, Paradenya, Port-of-Spain, Rio, or even our own Soledad in Cuba. There are good reasons why this should be and there is no reason why each one of these gardens should not have its own characteristic collection and be itself and not a copy. A notable feature of the Fairchild Tropical Garden is its palms. Palms grow especially well on the rocky, apparently sterile soil of southeastern Florida, and the Montgomerys, who have the largest collection of palms in a private preserve in the world, have pushed the palm collection in the Fairchild Tropical Garden. There are 300 species established here now and the garden is not yet six years old.

A most interesting adjunct is the charming little Palm Products Museum. This unique institution contains only objects habitually made from the fruit, leaves, or stems of palms from all parts of the world, from carnauba wax from Brazil to tinned hearts of palm from far Réunion. The whole collection is housed in a gem of a building presented to the garden by Bob Montgomery's partners in business. Here the secretary, my friend Mrs. Love,

has her office. There is a well-filled library with a comfortable place to read.

The garden is superbly laid out, with many alluring vistas. There is a long pergola with a grand collection of flowering vines, and an overlook giving out towards the sea with green water from ponds dug in the low muckland, and a formal glade, fringed with a collection of palms and named for that well-beloved Nestor of American horticulture, Liberty Hyde Bailey. Fortunately the land chosen for the garden was once part of one of the oldest tropical fruit plantations in South Florida, and there is a grove of fine old mango and alligator pear trees. There is a single enormous mamey apple tree which provides ready-made shade – and fine deep shade at that – for the delicate palms which normally grow in deep forest.

In comparison with Buitenzorg, or any other tropical garden of which you may think, one fact is sure: no garden has ever, in such a short time, become more lovely or been so widely enjoyed by many people. It is only five years old. Both David Fairchild and Bob Montgomery have a host of friends, and numbers of them have contributed choice, full-grown trees to beautify this garden. Large palms transplant easily and in most cases show no effect whatever from having been moved.

What the Arnold Arboretum is to the New England region, the Morton Arboretum to Chicago, or the Shaw Gardens to St. Louis, the Fairchild Tropical Garden will be to the only speck of tropical mainland on the North

American Continent. I have derived great pleasure and satisfaction from being allowed to help, especially with the setting up of the museum exhibits, and they are certainly well worth the trouble which it takes to go to see them. Generations yet unborn, as they stroll through these lovely scenes, will utter many a gentle blessing, in which the names of Fairchild and Montgomery should be conspicuous.

CHAPTER XVII

The Everglades National Park

SOME years ago someone had the bright idea that it was not too late to save a portion of the Everglades, and the Everglades National Park gradually began to take form. No lance is ever broken against a windmill unless there is a knight to thrust a spear. In this case Ernest F. Coe is the generous man of vision who has kept hammering at this project night and day with most unselfish singleness of purpose. The project has been carefully examined by and has duly received the sanction of our National Park authorities. There are no longer skeptics who question whether the area is worthy of being given National Park status. All that is needed is money to buy up certain lands privately held and, what is much more to the point, certain oil rights which are outstanding.

The face of nature has been changed by the fact that oil has been found at Sunniland only a short distance north of the proposed National Park boundary. This is a valid well about 10,600 feet deep. The theory had always existed that if oil were there it had leaked out around the sides of the submarine walls of the platform on which Florida stands. This well, however, comes from deeper down within the walls themselves, so we can now

assume that the oil field is there and within reach. This immensely complicates the problem of the Park. For you cannot have drilling and oil production carried on in a natural preserve.

Meantime the State and National Audubon Societies and numberless other farseeing organizations have endorsed the Park and every naturalist and conservationist still prays that the day may come soon when the hunting shall cease, before the turkeys, deer, bear and panthers are all gone. Extermination in this type of country is dead easy. The fact that the entire area has thus far been spared from destruction by fire is due to the hand of Providence alone. It has been set to burning time and time again, but the muck is shallow over most of this area and any good pelting downpour of rain takes care of the situation.

The incredible frosts of the spring of 1939, which killed the mangroves and other strand trees around the shores of the mainland in the southwest corner of the state, fortunately did not cross even narrow bands of sea water, so that the great climax forest of strand trees on the Ten Thousand Islands survived.

The Park as proposed would be an area of about two thousand square miles. Generally speaking, it would take in western Dade County, all of Munroe County that is on the mainland, and the southeastern corner of Collier County. There is little or no marketable cypress here but there are plenty of heads and strands with trees big enough so that it may be hoped that the various species

of heron and ibis will settle down to nest regularly in this area, once they learn that they will never be disturbed. The coons and otter will come back in a wink. The deer will be protected from the year-round depredation of cracker and cattleman. There are still enough panthers in the area for restocking purposes. Only about the bear am I doubtful, for this is not as ideal bear country as that directly north of the Royal Palm Hammock in Collier County and the area about Deep Lake.

I will confess that the Indians present a problem. If they are to be prevented from hunting in the Park some *quid pro quo* in the form of rights elsewhere must be provided. The Seminoles have never been willing to subsist on government rations and I rather doubt whether they can be persuaded now to go on the dole. I have wondered in my own mind whether it might not be possible to make them over into a body of wardens who would patrol the property against poachers. Human nature being as it is, I doubt whether this would work out. In the game reserves of South Africa, native wardens are efficient against marauding natives but any attempt on the part of one of these to arrest a white man does not work out well and all sorts of unfortunate results follow. No Florida cracker would ever submit to arrest by an Indian. Personally, I do not believe that poaching is going to be a serious problem. The bringing of visitors to the area will obviously be of profit to all and sundry, if there is enough to see to make tourists' visits well worth while.

This is pretty easily demonstrated to all but the most inveterate and bloodthirsty hunters.

A loop road running down from Homestead to Cape Sable and around the boundary of the Park, fetching up in Everglades, would, I should think, probably give the average visitor a fairly good chance to see all the different types of scenery and vegetation included in the Park area. What birds and animals will be visible will, of course, depend on the rapidity of their increase, and their tameness, which will only come with time if they are completely undisturbed. Promiscuous wandering about the area on the part of visitors I think will more or less take care of itself. Redbugs and other insect pests, standing water, and the fear of snakes will help.

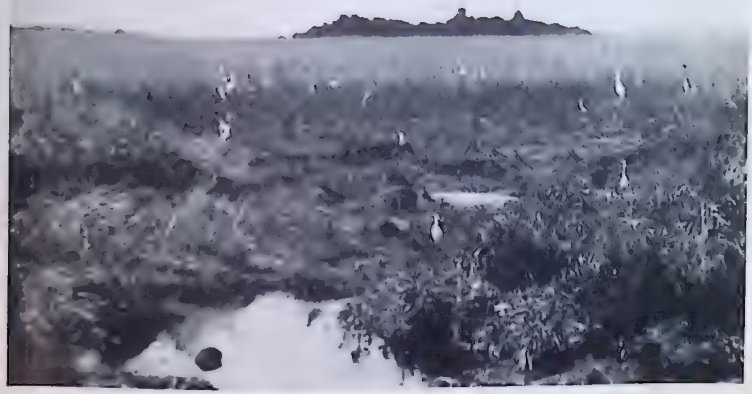
The sad feature of the whole situation is the time element. If the Park does not come into being soon, the whole idea may just as well be forgotten for good and all. Happily, some eyes have been opened recently to the nonsense inherent in the belief that all the Everglades lands have extraordinary agricultural possibilities. Some have, and some most certainly have not.

If you want to see a sample of the extravagant forecasting of the ignorant, read the predictions regarding Everglades land in Rex Beach's book *The Miracle of Coral Gables*. Here he declares that drainage will make available an enormous acreage which, on account of its fertility, will be capable of supporting a population denser than that of the Dutch Lowlands, with various

other agricultural exaggerations to match. This is plainly preposterous.

As a matter of fact, the United States Soil Conservation Service, which during the last two or three years has been examining the Everglades intensively, finds that not more than 20 per cent of the total acreage involved is suited to agriculture. This too only applies to those areas where the topsoil is so deep that the frequent and devastating fires, which seem to be an inevitable concomitant to drainage, while they may burn, will not necessarily burn off all the muck. Fortunately the muck burns rather slowly and showers do fall every once in a while. When there is standing water on the Glades the bacteria in the submerged soil are relatively quiescent, but when the lands are drained these bacteria become active and the consequent loss of soil, through oxidation, is startling in the extreme. Raw lands, after drainage, lose about one inch a year; and if brought into cultivation may lose a foot and a half during the first ten years. Thus, even taking no account of fires, these agricultural lands are inevitably short-lived. The town of Belle Glade, on the southeastern shore of Lake Okeechobee, has lost some six feet of its twenty-two-foot elevation during the last thirty years.

In short, after all the expense of drainage it is perfectly obvious that these "marvelous agricultural lands," even the best of them, will be "marvelous" just so long and no longer. How much of a climatic change is involved in this criminally stupid policy southern Florida has only



The Everglades. Note the egrets in the upper picture

recently discovered, for frost follows drainage. Of course thousands of acres of the southern Glades, along the Tamiami Trail, have already been completely destroyed by fire. In some regions the thin layer of black muck burnt off completely with the first fire. In other cases, where rains have brought relief, it has taken several fires to accomplish this result. In the regions where the deep muck gets burning no ordinary shower will affect the situation at all. Indeed this muck will continue to burn during a cloudburst if it is of but short duration. On Cape Cod, when we have forest fires, modern fire fighting equipment gets promptly to the right spot and can put the fire out. But when the Glades get to burning even after a long period of dry weather the fires don't travel with a rush and they do not appear to be so dangerous to human lives as our wood fires may be. But they are terribly destructive and deep down – and here all fire fighters can do is to rest or hop up and down and whistle. For they are helpless. The Dismal Swamp in Virginia has been burning for three years.

One of the most potent arguments in favor of the speedy development of the Everglades National Park Reservation is that if the 2000 square miles be immediately surrounded by a dike, after a season of good rains (Florida has an average of sixty to sixty-five inches of rain a year) it would be possible to keep this area of the Glades under water in its original natural condition and thus protect the grasslands and such hammocks as have not already been destroyed by fire.

Some wells in the Miami area have already begun to run salt water. This means that water from the ocean, which is, of course, under pressure, has invaded the deep subterranean drainage systems where previously there was sufficient pressure of fresh water derived from the seepage from the wet Glades to hold the salt water where it belonged. If some foresighted and intelligent long-range system for the control of haphazard ditching and draining, and for getting the fresh water back where it belongs, is not forthcoming, the city of Miami is going to wake up some fine day and find itself with a water supply which is salt and not fresh. That will be a real opportunity for the realtors to scratch their heads and worry.

CHAPTER XVIII

The Future

I OFTEN wonder what the immediate future of Florida will be.

I have no doubt in the world that North Florida will continue to exist more or less as it is now, a land of small farms, tung-oil groves, melon and peanut fields. There will naturally be some changes in the way of living, following rural electrification and similar modernizations. These changes will modify conditions in northern Florida but not revolutionize them.

Central Florida, north of the big lake, will continue for many years to be the enormous citrus-growing area which it is today. The Okeechobee district may continue to grow sugar cane in the postwar world – though it can be doubted. I say this because when the transportation of the future is re-established and augmented, as it will be, sugar grown in America will not compete economically with sugar grown in the tropics. Garden truck will be grown on the present gigantic scale until the muck land peters out, as it will. This will also be true of the so-called "Homestead area," in extreme South Florida, which will continue to be a region of great truck gardens. No doubt there will be a heavy increase

there in the planting of strictly tropical fruits, mangoes, alligator pears, and so on, as the demand for these fruits increases throughout the rest of the country.

The city of Miami, however, is clearly destined for continuous future growth, provided a fresh water supply, capable of caring for a greatly increased population, can be found. Any water supply that depends on wells driven within a few miles of the Continental Shelf, near deep salt water, is unreliable. Replacement pressure from the ocean, when the deep fresh ground water is drawn away, is an ever-present peril in any such situation, and nowhere more so than in Miami. If its deep well suddenly went salt, there would be no remedy except a sudden exodus until matters could be remedied.

Geographically considered, it is obvious that Miami will surely be the air-travel center of the western world. The real question which occurs to any thoughtful person is whether the population of this area will pull itself together, take itself seriously, and organize itself to make the city something besides a great amusement center — and a mighty cheap one at that; in other words, a great, big, overgrown honky-tonk.

I was told once of a person motoring into Los Angeles who arrived after dark and was stopped at a traffic light. Looking about he saw two flashing neon lights. The one on the right hand flashed *COLONIC IRRIGATION;* the one on the left, *COME TO JESUS.*

Courtesy of Worth Monroe

Miami River, 1884

Courtesy of D. Fairchild

The same spot, 1944

In spite of getting off to a pretty poor start, and with the incubus of the movie world to carry, Los Angeles supports two great universities and a highly important center of scientific research, a natural history museum with rich resources, to which any city could point with pride.

Miami, to be sure, already has more than the nucleus of a university, and this is all to the good. I say Miami has. Actually, its neighbor Coral Gables has. And Coral Gables makes a yeoman effort to support it loyally. Miami gets a great service from this school, also a good deal of the credit for it among those who don't know the facts, and provides little support.

There are a number of sound educational institutions in Florida: the University at Gainesville, the Woman's College at Tallahassee, Rollins College, Stetson University, the University at Tampa, and so on. With its extraordinary facilities for teaching and research in tropical biology, and its unrivaled contacts with all parts of America to the southward, any university situated in the Miami area will inevitably grow and perhaps in time become the first educational center in the whole southern part of our country. But until the Miami City Fathers begin to think more in terms of the increase of library facilities and the building of new and better laboratories, and less about dog tracks, horses, and peeled bathing beauties, matters will stay as they are, with the things of the spirit more or less in hiding, under a bushel. The

city must take care lest it continue to be a locality of which very few of its inhabitants can be proud, and where those who are proud will be looked upon with shame by all their decent neighbors.

Few people realize that Florida is one of the great cattle-raising states in the Union; statistics are never wholly to be relied on, but it is certainly among the first half-dozen. The matter has been little considered because the cattle were of the poorest conceivable quality. They have been thin and starved during the long dry seasons, and they are never very fat even after the rains come. Now real efforts are being made in some districts to improve the fodder and, by the introduction of Brahma bulls, to improve the stock. The cattle are looking up, but one cannot say the same for the cattlemen. They have been the perhaps most obstructionistic group in the state; shrewd enough to organize well, they have wielded an influence in Tallahassee far beyond that justified by their numbers. It is because of them that Florida has never enacted a fence law. Cattle and hogs wander about over the highways of the state and are the cause of innumerable accidents.

Enough had been said elsewhere concerning the lumbermen. Practically all of the marketable timber in the state has been destroyed by lumber companies who literally cut and run. They make no serious efforts to reforest and pay little attention to leaving sound seed trees in their cuttings. Add to the activities of these groups the realtors and the drainage promoters, and you

have about summed up the roster of the roots of all evil for Florida.

The advantage which Miami offers for the establishment of a marine biological laboratory by no means completes the picture of what the state, and I speak now especially of tropical, southern Florida, offers in the future. Sooner or later a great university will grow up on the foundations laid by the University of Miami in Coral Gables. A population growing by leaps and bounds will demand, and sooner or later will have, better facilities for training physicians and surgeons. This means, incidentally, concomitant medical research.

Marine biology is a rather sickly plant when grown all by itself, and here there is surely no need for it to grow alone. The Deering and the McCormick families have the finest area of hammock land still undestroyed. Their great Cutler Hammock is a natural marvel, and it is inconceivable that after it has been preserved to this late date it should not be treasured in perpetuity. The Cutler site faces the Bay. Therefore all of the varied environments which I have discussed elsewhere are accessible to an institute placed here. The Fairchild Tropical Garden and the Chapman Field Plant Introduction Garden of the United States Department of Agriculture provide ready-made resources for work in a dozen botanical fields, and the hammocks provide other facilities for work in either botany or zoology. When these facilities come into being, and that assembly of outstanding

intellectual figures who have grouped themselves around Coconut Grove for years is reinforced by the type which assembles naturally about a university, what will be the result? Organizations such as the symphony orchestra will grow stronger and become objects of civic pride, and the best elements of the community will rise to a position to dictate the direction which future city evolution will take.

This outline may sound ridiculously rosy but it is no daydream. It is as inevitable, and as certain to come into being sooner or later, as that today will be followed by tomorrow.

The Miami area has something unique to capitalize: the fact that it is quite definitely tropical, yet an integral part of the United States. Looking ahead to the far distant future, it seems probable that if we have a great tropical research institution in this country, the library and permanent headquarters should be right here, with field stations set up in various localities. There might be one in the Canal Zone, perhaps tied up with the Barro Colorado Island Laboratory. There should be one in the Llanos of northern South America, perhaps connected with the Rockefeller Laboratory at Villavicencio in Colombia. One would be in southern Brazil, affiliated with the Brazilian Biological Research Area at Alto da Serra. There would certainly have to be another in the high Andes and another in temperate southern South America. With the aviation facilities which will come into being in the postwar world, almost any research

material could be brought to Miami from anywhere in tropical America in a matter of hours. The more one thinks of it, the more one lets one's imagination run riot, the greater the possibilities for scientific research appear to be. The dog tracks fade out in the landscape. This is what we are trying to bring about.

Florida has got to become a homeland where people live normal lives, just as they do in other parts of the United States. It must cease to be purely a region to be exploited and flung aside, having been sucked dry, or a recreation area visited by people who come only for a good time, who feel no sense of responsibility, and have no desire to aid and improve the land of their temporary enjoyment. It must cease being treated as a colony, and become a vital, integral part of the American Union.

Acknowledgments

A list of those to whom I am grateful in connection with this book should be headed by David and Marian Fairchild, followed, *pari passu*, by Robert L. and Nell Montgomery, Mr. and Mrs. Harold Loomis, all of Coconut Grove. Professor Archie Carr and Margie Harris Carr his wife, both talented naturalists, have given me friendly and frequent assistance. At Tallahassee Herman Gunter and Clarence Simpson have helped me with information on numerous occasions, and I was proud to sit beside the former on the platform at the University of Florida Commencement in May 1944, when we both received Honorary Degrees. Barbara and William Schevill and Dr. Theodore White, all of the Staff of the Museum here, have been with me on many happy occasions. There are countless other friends living and dead to whom I owe a debt of gratitude. I must hold their names *in pectore* or make this list of acknowledgments unduly long.

I cannot forget, however, Mrs. C. S. Love and my secretary of many years standing, Miss H. M. Robinson, who, with Betsy Dall, now Mrs. Robert Petersen, helped with the preparation of this manuscript. My colleague at Harvard, Professor Paul Manglesdorf, gave the lovely photograph of the coconut palm, which is the frontispiece.

Index

Acrosoma, 217
Adonidia Merrillii, 213
Agassiz, Prof. Louis, 106
Agassiz Museum, 9, 88, 142, 186, 187
Airplants, 167–171
Alachua Savanna, 24, 133
Alcyonarians, 107
Allen, Dr. Glover M., 132, 133, 139, 140
Allen, Ross, 83 *n.*
Alligators, 15, 129, 146, 151, 178, 179, 182–186, 187–193
Amaral, Afranio do, 218
American Museum of Natural History, 9, 179
American Spiders and Their Spinning Work (McCook), 176
Amherst College, 19
Anastasia Island, 20, 194
Anemones, sea, 107
Angelfish, 108
Anopheles, 100–101
Antelopes, fossil, 11, 12, 17
Apalachicola River, 6, 156
Arcadia, 143
Archer, 10, 11
Armadillos, fossil, 16, 19
Arnold Arboretum, 222
Ash trees, 157
Audubon Societies, 138, 152, 225
Australian pine, 83–84
Avicularia, 176
Baekeland, Dr. L. H., 207
Bahama Islands, 67, 68, 70, 81, 106
Bahia Honda Channel, 201
Bailey, Liberty Hyde, 222
Banana holes, 163
Banana River, 37, 38, 103
Banks, Prof. Nathan, 220
Banyan trees, 172
Barbour, Frederick, 17
Barbour, Louisa, 14
Barbour, Robert, 181
Barbour, Rosamond (Mrs. Thomas), 14, 39, 53, 67, 87, 94, 96, 117, 129
Barro Colorado Island Laboratory, 236
Bartram, John, 22–23
Bartram, William, 22–24, 26–27, 78, 89, 182, 186, 187
Bass, 31, 87, 129, 146, 153
Bats, 68–69, 131–134
Bats (Allen), 132
Beach, Rex, 227
Beaches, 102–105
Bears, 143, 226
Beavers, 136
Bedell, Harriet, 52–53
Bee tree, 116
Beeches, blue, 164
Beefwood, 83–84
Belle Glade, 228
Bermudas, 106, 109, 110
Big Cypress Band, 52

Big Pine Key, 202
Big Springs, Missouri, 123
Bimini, 116
Biscayne, Bay, 84, 99, 125
Bison, fossil, 19
Bivins Arm, 159, 187
Bivins Arm Sanctuary, 133
Boca Raton Lake, 125
Bonita Springs, 105
Bonnet worms, 128
Boston Society of Natural History, 41, 42
Bowlegs, Billy, 50
Brazilian Biological Research Area, Alto da Serra, Brazil, 236
Breams, 31, 128, 153
Brickell Hammock, 162, 165
Brighton, 49
British Museum of Natural History, 18
Bromeliads, 168
Brooks, Major Allan, 135
Bryant, Dr. Henry, 142
Butterflies, 132, 203, 215, 218–219
Butterfly fish, 108
Buttonbush, 174
Buys, Brandts, 76

Cabbage trees, 80, 163
Camellia japonica, 22
Camels, fossil, 7, 13, 17, 19
Campos Porto, Dr., 218
Canal Point, 93
Captiva Island, 105, 194
Capybaras, 14
Carissa, 214
Carlisle, Frank, 18, 86–99 *passim*, 129, 130, 143, 190–191
Carr, Dr. Archie, Jr., 3, 120, 122, 149, 150, 153, 161
Carr, Margie Harris, 149
Carter, Sir Gilbert, 197
Casuarina equisetifolia, 83–84
Catfish, 31, 93
Cattle-raising, 234
Cedars, 27
Cephalanthus, 174
Ceratophyllum, 174
Ceratopteris, 172
Chameleons, 209
Chapman Field Plant Introduction Garden, 235
Charleston Museum, 142
Chattahoochee River, 6, 136, 156
Cherokees, 27
Chewinks, 214
Choate, Charles, 89
Choate, Louise, 89
Chuckaloskee, 195
Citrus cultivation, 64–65, 231
Clench, W. J., 67
Climate, 62–68
Clusia rosea, 169
Coconut Grove, 134, 236
Cocos nucifera, 217
Coe, Ernest F., 224
Coleridge, Samuel Taylor, 33–34
Collinson, Peter, 22
Comstock, John Henry, 176
"Conchs," 111–112
Congo eels, 150
Coontail, 174
Cooper, Dr. Foster, 18
Coots, 94, 126, 152
Coral Gables, 233
Coral reefs, 106–109, 110
Corallinaceae, 107
Coreopsis, 80
Cormorants, 174, 194
Cory, Charles B., 55

Cosmos, 80
Cow Creek Band, 52
Crabs, 103
Crackers, 89
Cranes, 24, 74, 124, 129, 188
Crayfish (Hobbs), 3, 150
Creatopus, 172–173
Creel, Lorenzo D., 48
Croakers, 103
Crocodiles, 27, 31, 178–182, 186–187
Cross Creek (Rawlings), 5
Crustacea, 107
Cuba, 67, 68, 70
Cupay, 169
Custard Apple Ridge, 146
Cutler Hammock, 170, 235
Cypress trees, 52, 71–72, 75, 82–83, 147, 225

Dade County pine, 79
Dania Agency, 46, 52
Daytona, 102
Decodon, 174
Deep Lake, 226
Deer, 24, 74, 87, 137–140, 164, 194, 202, 226; fossil, 13, 17
Deering, Charles, 170
Deleon Springs, 123
Dendropogon, 168
Devil's Mill Hopper, 159
Dickinson family, 187–188
Dictyosperma, 213
Dixie Highway, 86
Dogs, fossil, 13
Dogwood, 158, 161, 165
Dolomedes, 175–177
Dolomedes tenebrosus, 176
Doves, 14, 91
Drainage, 52, 64, 74, 82, 145–146, 230
Drumfish, 31
Ducks, 93, 126, 148, 152
Dunellon, 119

East Florida, 6
Eastern Queen (ship), 4
Eau Gallie, 4, 35, 39, 91
Eau Gallie River, 38
Egrets, 4, 148, 151
Eichhornia, 172
Elephants, fossil, 15, 17–18, 19
Epiphany, Feast of the, 114–115
Epiphytes, 167–171
Equus, 18–19
Eureka, 83
Everglades, 72, 82, 84–85, 130, 134, 146, 147, 168, 227–230
Everglades National Park, 54, 138, 224–230
Exploring for Plants (Fairchild), 204
Eyer, H. C., 186

Fairchild, David, 66, 75–77, 170, 204–208, 219–220, 222, 223
Fairchild, Marian, 206, 207, 209
Fairchild Tropical Garden, 162, 216–223, 235
Ferns, 162, 172
Ficus, 169–172, 212, 214, 215, 219
Fig, strangler, 169–171
Fires, 74, 76–77, 85, 146, 162, 228, 229
Flatwoods, 78–79, 81
Flint River, 6, 136
Flintheads, 152
Floras (Small), 3

Florida Association of Women's Clubs, 162
Florida State College for Women, 233
Florida State Geological Survey, 8, 9
Forest Service, 72
Forestry School, Gainesville, 84
Forests, 71–72, 74–80, 81, 84, 168–171, 234
Fort Myers, 105
Fossils, 7, 8, 11, 13–21, 74, 136
Fountain of Youth, 116
Foxes, 88
Frangipani, 198–200
Franklinia altamaha, 23
Freezes, 63–65
Frick, Dr. Childs, 10
Frogs, 94, 118, 150
From Eden to Sahara – Florida's Tragedy (Small), 74
Fuller, Mrs. W. F., 172
Fundulus, 151

Gainesville, 10, 23, 65, 84, 187
Gallberries, 80
Gallinules, 126, 152
Gambusias, 151, 175
Garcinia, 212
Garfish, 31, 153, 154
Gasterocantha, 217
George, Lake, 30
Geronimo, 4
Glade Cross Mission, 52
Golden Beach, 181
Golden Coconut of Malaya, 217
Gonotista grisea, 220
Grackles, 152
Great Sink, 26
Greeks, 111, 113–115
Greer Springs, Arkansas, 123
Grindles, 153
Griscom, Ludlow, 71
Gunter, Dr. Herman, 9, 120

Haideotriton wallacei, 122
Halifax River, 125
Hammocks, 157, 160–166, 235
Harris, John, 190
Harvard University, 170
Hawks, night, 134
Heaths, 156
Helen Blazes, Lake, 125
Heliconii, 215, 218
Hernandez, Gen., 58
Herons, 129, 152, 160, 174, 194, 202, 225
Herpetology of Florida (Carr), 3, 122
Heterandria, 151
Hibiscus, 214–215
Highland Hammock, 163–164
Hipparion, 17
Hippospongia, 113
Hispaniola, 68
Hobbs, Horton, 3, 150
Holder, Dr. J. B., 179
Holly, 164
Homestead area, 231
Homosassa spring, 120–121
Hooton, Earnest, 43
Hopping John, 196
Hornbeams, 157
Horses, 19–20, 24; fossil, 7, 12, 13, 17, 18
Howell, A. H., 3
Humbert, G., 76
Hume, Dean Harold H., 22, 156, 157
Hungryland, 87

Hunting and Fishing in Florida (Cory), 55
Hunting-ground, The, 171
Hurricanes, 62, 66–70
Hyacinths, water, 148–149, 172–173
Hyenas, fossil, 17
Hypermekops, 13

Ibis, 4, 92–93, 129, 152, 160, 194, 225
Immokalee, 53
In Lower Florida Wilds (Simpson), 200–201
Indian River, 35, 36, 37, 38, 65, 103, 125, 126
Indian Town, 53, 87
Indians, prehistoric, 41–44
Inland waterway, 125
Insects, 70
Ipomoea, 202
Iris giganticoerulea, 130
Ironwood, 164
Isopods, 209

Jackdaws, 152
Jacks, 120
Jackson, Andrew, 50
Jacksonville, 118, 126
Jamaica, 68
James, Arthur Curtiss, 207
Jane Green Cypress Swamp, 82
Jasmine, 158, 165
Jorees, 214
Judson College, 160
Juniper Springs, 119
Jupiter, 4, 36, 86

Kalachuche, 200
Kampong, The, 206–215
Kennard, Gene, 129–130
Key Largo, 140, 201
Key West, 6, 125, 139, 195–199
Keys, 67, 70, 81, 125, 134, 144, 161, 195, 200–203
Khat, 212–213
Killima, 218
Kingbirds, 69
Kissimmee, 83
Kites, 69
Komarek, Ed, 138
Komarek, Roy, 138
Kubla Khan (Coleridge), 33

Labridae, 108
La Gironière, Paul de, 186
Lakes, 123–130
Leidy, Dr. Joseph, 7, 16
Leptolucania ommata, 150
Lettuce, water, 172, 175
Lignum vitae, 161
Liguus, 67
Lilies, 128, 149, 157–158
Limpkins, 117, 129
Lions, fossil, 13
Little Pine Key, 202
Liverworts, 159
Lizards, 208, 209
Long Key, 201
Long whites, 151
Loomis, Harold, 44
Lostman's River, 142, 152
Lotos, golden, 149*n*.
Louisiana, 71
Love, Mrs. C. S., 222
Lowes, Prof. John Livingston, 33–34
Loxahatchee Marsh, 87
Loxahatchee River, 98
Ludwigia, 120

Lupins, 156
Lynxes, bay, 141

McCook, Henry Christopher, 176
Madagascar, 76
Madagascar (Humbert), 76
Magnolias, 24, 28, 157, 164
Mahogany, 161
Malabar, 135
Malaria, 48, 99–100
Mammoth Spring, Arkansas, 123
Manatees, 98–99, 166–167
Mangroves, 194–195, 202
Mantes, 220
Maples, 165
Marco Island, 44, 194
Marion, Fort, 4, 59
Masters, John S., 58
Mastic, 161
Mastodons, 7, 17, 116
Matacumbe Key, 142, 201
Matanzas River, 125
Matheson, W. J., 162, 207
Matheson Hammock, 216
Matthew, W. D., 7
Megatherium, 16
Melbourne, 18, 19, 21, 82, 149
Merkus pine, 76
Merrill, Prof. E. D., 44, 200, 213
Merritt's Island, 36–37, 103, 195
Miami, 4, 106, 109, 110, 165, 166, 230, 232–234, 235–237
Miami Aquarium, 190, 192
Miami River, 166
Micanopy, fort, 57
Micco, 125
Mice, 135, 194
Micrurus fulvius barbouri, 211
Mikasukis, 50
Miocene Age, 9–10, 11, 12–15, 21
Miracle of Coral Gables, The (Beach), 227
Mixter, Dr. Samuel J., 91
Moccasins, 90, 97, 129
Mollienisias, 151
Mollusks, 70, 107
Molossoids, 68, 133
Montgomery, Nell, 216, 221
Montgomery, Robert L., 216, 221, 222, 223
Morton Arboretum, 222
Mosquito Lagoon, 125
Mosquitoes, 99–101, 144
Moss, Spanish, 80, 167–168
Moultrie, Fort, 59, 61
Mounds, 37–38, 39–44, 127, 194
Mullet, 118, 120
Munroe, Kirk, 207
Munroe, Commodore Ralph Middleton, 179
Murraya bushes, 212, 213
Muskrats, 136, 159
Mustela peninsulae, 135
Myrtle, 27

Nassau, 68, 107
National Park Service, 72
Neal, Dr. J. C., 7, 10, 16
Nelson, E. W., 134
Nelson, George, 150
Neochoerus, 14
Neofiber, 159
Neuroptera, 219–220
New Providence, 68
New Smyrna, 65
No Name Key, 202
Northers, 62, 63–64

Oaks, 28, 80, 82, 157, 163
Ocala National Forest, 83, 119

Ocracoke Island, 20
Odocoileus virginianus clavium, 139, 140
Oil, 224–225
Okeechobee, Lake, 74, 93, 123–124, 145–146, 231
Okeechobee City, 50
Okeechobee Indians, 49, 52
Oklawaha River, 118
Oleanders, 174
Oligocene Age, 7, 21
Orange Lake, 174
Orchids, 80, 153–154, 167, 208
Osceola, Chief, 55–61
Osceola, Cory, 55
Ospreys, 98
Otters, 136–137, 151, 226
Ovenbirds, 214
Owls, 95
Oxen, fossil, 19
Ozark Plateau, 123

Paine's Prairie, 133, 148, 159
Palm Beach, 68, 86, 89, 103
Palm Products Museum, 221
Palmettos, 80–81, 163
Palms, 24, 28, 80–81, 162, 213–214, 217, 221
Pandans, 214
Panthers, 141–142, 194, 226
Papilio, 215
Paradise Key, 162
Parker, Dan, 88
Parrot fish, 108
Parrot's-feather, 174
Partridgeberries, 164
Peabody Museum, 40, 43, 53
Peacock, Charley, 180
Peccaries, fossil, 17
Peepul tree, 172
Pelican Bay, 93
Pelicans, 103, 194
Pensacola, 6
Perch, 151
Percy, Lord William, 93
Perdido River, 6
Phillips, John, 89, 91, 92, 97, 142, 169
Phosphate beds, 11, 21
Pickerel weeds, 188, 189
Pigeons, 69
Pigs, fossil, 11
Pill Bugs, 209
Pinewoods, 78–80, 82, 157, 202
Pistia, 172
Pitcher plants, 80, 130
Pleistocene Age, 15, 17–20, 21
Pliocene Age, 10, 11, 16–17, 21
Plumeria, 199
Poinsett, Lake, 126
Polyrrhiza Lindeni, 153
Pompano, 103, 104
Ponce de León, 116
Pondoland, 76
Pontederia, 188
Porcupines, 14
Porpoises, 103
Pottery, 40, 43
Proteus, 121
Puerto Rico, 68

Quail, 87, 90, 92

Rabbits, 136, 214, 219
Raccoons, 134–135, 194, 226
Rainbow Spring, 119–120
Ramrod Key, 144
Rana sphenocephala, 94
Rats, cotton, 135, 202
Rattlesnakes, 96

Rawlings, Marjorie Kinnan, 5, 94
Rays, 31
Redbuds, 158, 165
Redbugs, 97
Rhegminornithidae, 14
Rhinoceros, fossil, 7, 15, 17
Rhododendron Chapmani, 156
Robins, 91
Rockefeller Laboratory, Villavicencio, Colombia, 236
Rockledge, 186
Rollinia, 219
Rollins College, 233
Roses, Cherokee, 158, 200
Royal Palm Hammock, 153, 226
Russell, George R., 186

Sabal, 80
Sagittaria, 120
Sailor's-choice, 36
St. Augustine, 4, 22, 36, 58, 59, 65
St. Johns River, 4, 22, 40, 118, 124–126, 172, 173, 175
St. Johns River marsh, 130, 149, 187
Salamanders, 121–122, 150
San Marco, Texas, 121
Sand Key, 202
Sanford, 126
Sanford, Dr. Leonard C., 93
Sanibel Island, 105, 194
Santa Rosa Island, 194
Sargent, Charles, 171
Sargent, John Singer, 170
Schevill, Barbara, 9, 134
Schevill, William E., 9, 134
Scott, Dr. W. B., 16
Scrubs, 5, 82
Sea fans, 107
Sea Gardens, Nassau, 107
Sea trout, 37
Sea urchins, 8, 108
Sea whips, 107
Sebring, 163
Selaginella, 159
Seminole Wars, 45, 56–59
Seminoles, 24, 27, 43, 45–55, 226
Seminoles of Florida, The (Willson), 55
Serenoa, 80
Sergeant fish, 36
Shark River, 141, 195
Shaw Gardens, 222
Shedd Aquarium, 198
Sheepshead, 31
Shells, 8, 105–106, 114
Sherman, Dr., 133
Short whites, 151
Silver Springs, 118
Simpson, Dr. Charles T., 162, 200–201
Simpson, Clarence, 8–9
Simpson Memorial Park, 166
Sinks, 26, 159, 162
Skate, 31
Skunks, 73
Sloths, fossil, 16, 17
Small, Dr. John K., 3, 74, 146, 158 *n.*
Snails, 67, 165
Snake River, Idaho, 123
Snakes, 73, 90, 96–97, 129, 201, 210–211
Snook, 36, 120, 155
Sofkee, 49
South Moon Under (Rawlings), 5
Spatterdock, 188
Spider Book, 176
Spiders, 175–177, 209–210, 217
Sponge fishing, 110–114

Sponges, 107, 113
Springs, 116–123
Sprunt, Alexander, 142
Squirrels, 140–141, 208
Stabler, Herbert, 218
Starfish, 108
Starke, 157
Stejneger, Leonhard, 121
Stetson University, 233
Stewart, Billy, 88
Stoddard, Herbert, 138
Storks, 152
Sugar cane, 231
Sunniland, 224
Surgeon fish, 108

TADARIDA, 133
Tamiami Trail, 46, 53, 54, 82, 147, 151–155, 229
Tapirs, fossil, 11, 19
Tarpon, 120, 154
Tarpon Springs, 111, 114, 115
Taxodium distichum, 75
Tecumseh, 56
Ten Thousand Islands, 111, 142, 153, 194, 225
Thomas farm, 8–10, 11, 14, 21
Ticks, 137, 138–139
Tigers, fossil, 17
Tillandsia, 168
Titusville, 23
Torch Key, 144
Tortoises, 73, 91
Tortugas, 109, 110
Travels (Bartram), 22, 23–26, 27–34, 89, 182–186
Triggers, 108
Trout, 31
Tube worms, 108
Tunicates, 107
Turkeys, 24, 74, 87, 94, 164, 174
Turner River, 152
Turtles, 91, 146, 154, 196
Twenty Years in the Philippine Islands (la Gironière), 186
Typhlomolge rathbuni, 121

Ululodes floridanus, 220
United States National Museum, 14
United States Soil Conservation Service, 228
University, Florida, 10, 22, 158, 159, 160, 233; Miami, 108, 109, 235; Tampa, 233
Utowana (yacht), 217
Utricularia, 148, 174

VALLISNERIA, 120
Vero, 21

WAKULLA RIVER, 118
Walden, 35–36, 38, 91
Warblers, 14, 208
Washington, Lake, 4, 124, 126–129, 174, 187
Weasels, 135–136
Weedon, Dr., 59
West Florida, 6
West Palm Beach, 21, 93
Wetmore, Dr. Alexander, 14
Wheeler, Prof. William Morton, 115, 217
White, Dr. Theodore E., 8, 9, 10, 135
Whiting, 103
Wildcats, 141
Williams, Dr. Talcott, 217
Williston, 10
Willows, 174

Willson, Minnie Moore, 55
Winder, Lake, 126
Wolverines, fossil, 17
Wolves, 142–143
Woodpeckers, 72
Wordsworth, Dorothy, 33
Wordsworth, William, 33
World Was My Garden, The (Fairchild), 76, 204
Worth, Lake, 125
Wrasses, 108
Wyman, Dr. Jeffries, 41, 42, 43, 178

Yearling, The (Rawlings), 5

Zanthoxylon, 27
Zephyranthes lilies, 80, 158